PLATINUM SERIES®
PRE-INSTALLATION MANUAL

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INTRODUCTION

This Pre-Installation manual provides information needed to assist in preparing for the installation of the Harris Platinum Z Series solid-state FM transmitters.

The Pre-Installation manual also outlines general information regarding the features, benefits and specifications of the Platinum Z transmitter, DIGIT® CD and SuperCiter™ FM exciters.

GENERAL DESCRIPTION

Platinum Z Series Features and Benefits

The Harris Platinum Z Series transmitters are a highly functional, cost-effective, FM radio transmitter, designed using a concept called Z-Axis 3D electronic design. The Z-axis approach arranges the system RF components such as dividers, combiners and amplifiers in three dimensions, to permit the most efficient possible signal paths between them. This method allows the transmitter amplifying group to be broken down economically into the smallest possible blocks for servicing and replacement. The ZCD series transmitters utilize the Harris Digit CD, Digital FM exciter, while the ZFM series transmitters are equipped with the Harris SuperCiter, an analog FM exciter.

All Harris Platinum Z Series transmitters include the following features and benefits:

- Power output range: 2 kW to 40 kW. Standard power levels are 2 kW, 3.5 kW, 5 kW, 7.5 kW, and 10 kW as well as combined power levels of 20 kW, 30 kW and 40 kW.
- All ZCD transmitters include the field-proven Harris DIGIT CD Digital FM Exciter. DIGIT CD accepts AES3 digital audio and generates a fully modulated RF carrier totally in the digital domain for the lowest noise and distortion available in any FM exciter (16 bit digital audio quality).
- Redundant, auto switching, IPA amplifiers to eliminate a single point of failure.
- Redundant RF amplifier modules that allow maintenance while the transmitter remains on the air at reduced power (“Hot-Pluggable” modules).
- Redundant power supplies to keep the transmitter on the air in the event of supply failure (optional in Z2 transmitters).
- Microprocessor based controller for advanced control, diagnostics and display capability. Includes built-in control logic and hardware for switching between main and alternate exciters and IPA amplifiers.
- Broadband design to eliminate tuning adjustments from 87 MHz to 108 MHz (N+1 capable). Frequency change can be done manually in less than five minutes using simple switch settings in the DIGIT CD exciter, and in less than 0.5 seconds using an optional, external controller.
- Quick start design provides full output power meeting all specifications within five seconds of an “ON” Command.
- Versatile air cooling design uses either an internal blower or an optional external air system.
- Dual output power settings along with a third available power setting for use with an UPS or generator backup system.
- Directional RF sample port provided for customer use.
- Available for single or three phase mains power, 50/60Hz. Single phase Z7.5, and Z10 transmitters require a second cabinet for the single phase power supplies. The upper two thirds of the second cabinet is standard 19” EIA rack space.

DIGIT CD Digital FM Exciter

The Harris DIGIT CD FM exciter is supplied as standard equipment with all Platinum Z transmitters. The DIGIT CD with its digital input module, generates the complete stereo FM waveform in the digital domain, using a digital signal processor (DSP) as a stereo generator and composite limiter. A 32-bit numerically controlled oscillator (NCO) is used as a digital modulator. These digital techniques allow direct connection of standard AES3 digital stereo audio data to the FM exciter eliminating the distortion and alignment problems of analog signal paths and analog FM exciters. The DIGIT CD is also available with an analog interface module for stations with analog program paths and is easily interchangeable with the digital input module.

SuperCiter Analog FM Exciter

The optional Harris SuperCiter is a high quality 55 watt analog FM exciter designed for broadcasters needing state-of-the-art analog performance at a value price. The SuperCiter combines time-proven PLL technology with modern RF amplifier circuits to provide driving power for an FM transmitter.

Redundant Exciters

Each Z series transmitter includes one exciter. Space is available for a second optional exciter. If the transmitter is not ordered with the optional exciter, all required exciter RF switching hardware, AC power and control wiring are included in the Z transmitter. If in the future an alternate exciter is desired, simply install the second exciter, connect three cables and configure the transmitter controller for two exciters via the front panel interface. The controller will monitor the exciters for proper operation. If a fault occurs the controller will switch to the alternate exciter automatically. It is also possible to manually switch exciters.

PA / IPA Modules

The PA and IPA modules are identical and interchangeable in the Z series transmitters. The modules consist of two independent RF amplifiers. Each RF amplifier uses two MOSFET devices mounted on a compact heat sink assembly and is capable of providing up to 425 watts of RF output power. Typically, the amplifiers operate between 320 and 340 watts. The PA module amplifiers plug directly into an isolated combiner without using channel sensitive RF cables. The PA modules can be removed without removing plugs and cables and are "hot-pluggable". Each PA module (2 RF amplifiers) is rated to produce 850 watts of output power into a system VSWR of 1.5:1 from 0°C to 50°C ambient temperature at sea level.

The IPA module uses one amplifier to provide the required drive for its associated PA amplifiers. This leaves one amplifier as a back-up in the event the primary IPA amplifier should fail. The transmitter has built in RF sensing, control logic and switching hardware which will automatically switch from the primary IPA amplifier to the back-up in the event an IPA should fail. The IPA amplifiers can also be selected manually from the front panel. Figure 1 shows an 850 watt PA module.

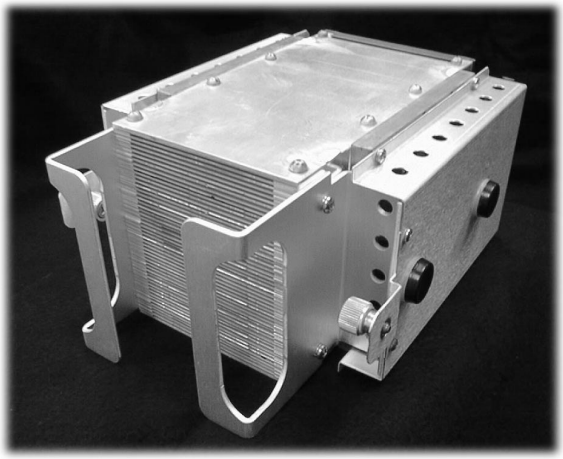


Figure 1
850 Watt PA / IPA Amplifier Module

Size: 9"D x 7"W x 4"H
Weight: 10 pounds

RF Power Combining

The RF amplifiers (one half of a PA module) are first combined in groups of six or eight (depending on power level) in a compact Z-Plane isolated combiner. True isolation means that in the event an amplifier fails the active modules will continue to work into a nominal 50Ω load, for almost zero stress to the active amplifiers. The outputs of the Z-Plane combiners are then combined further in 3dB hybrid combiners to produce the final output power. The Z2 transmitter uses one Z-Plane combiner and its output is the final output stage of the transmitter.

Power Supplies

Z series transmitters can be configured with single phase or three phase power supplies. The power supplies are step-regulated by reliable tap-selecting techniques (non-switching design). This approach provides high conversion efficiency, excellent power factor and very low line harmonics. The power supplies are mounted on a front rollout drawer for complete accessibility and ease of maintenance. The multiple supply concept protects against total loss of service due to loss of a single supply. The Z2 is provided with one supply with an optional second supply. The Z7.5 and Z10 single phase transmitters use a second cabinet to house the larger power supplies. The upper two thirds of the second cabinet is configured as standard 19" EIA rack space.

Figure 2 shows four three phase power supplies that have been rolled out the front of the transmitter. The power supplies are installed in the transmitter for shipment. Refer to the Electrical/Mechanical/Cooling

or Technical Data sheets for power consumption and fuse sizing for the transmitter of interest.

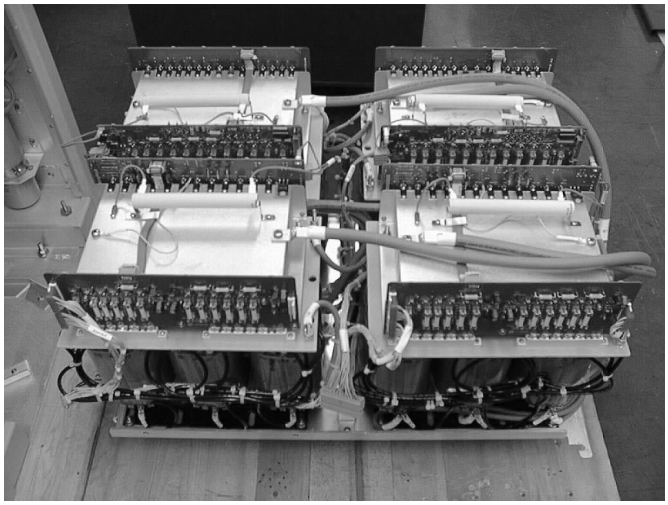


Figure 2
Four Three Phase Power Supplies

Control System

The Z series transmitters use a microprocessor based controller which monitors up to 100 operating parameters and functions of the transmitter. The controller makes intelligent operating decisions based on operating conditions. Detailed system information is available using the front panel diagnostic display and the controller is designed for direct connection to standard parallel remote control systems. The Controller provides VSWR overload protection, automatic power control, automatic VSWR foldback, RF power soft start, AC restart and other advanced functions. The controller includes built-in logic control for automatically switching to the reserve IPA amplifier, and an optional backup exciter. The Master controller is at the heart of the control system. In the event Master Control communication fails, a backup Life Support Controller keeps the transmitter on the air with basic control functions. Individual control boards for the Power Amplifiers and Power Supplies are used to control these subsystems. Redundancy is inherent in the PA and Power Supply control section as multiple PA and Power Supply boards are used. The control system front panel includes an output metering LCD display which is used to view the following parameters:

- Forward power in watts or percent
- Reflected power in watts or VSWR ratio
- Automatic Power Control (APC) voltage
- PA voltage
- PA current

A second LCD display permits viewing detailed parameters such as, individual voltages, currents and temperatures of the PA amps and Power Supplies. A fault Log displays detailed fault information to assist in easily pinpointing a problem area and stores up to 32 faults. LED's are used to flag the fault log content and other basic status information. Reliable membrane switches provide a means for browsing through the diagnostic system. Figure 3 below shows a top view of the controller, which may be removed with the transmitter operating.

Figure 3
Controller Top View

Low Pass Filter / Directional Coupler

All Z series transmitters use an efficient internal low pass filter for RF harmonic attenuation. Directional coupler ports provide highly accurate forward and reflected power samples to the controller and are located just after the low pass filter. An RF sample with 30 dB of nominal directivity is provided just after the internal low pass filter as well. This directional RF sample provides more accurate performance measurements by supplying a nearly reflection free RF sample source for external test equipment and AM noise monitors. Figure 4 shows the low pass filter line section and the directional coupler/RF sample ports.

Figure 4
Directional Coupler & RF Sample Ports

RF Output Termination

The RF output connector of all Z series transmitters is a standard 3-1/8" EIA Flange. The Z2, 3.5, and 5 transmitters include a 3-1/8" to 1-5/8" Reducer. If 3-1/8" EIA is desired you can simply remove the adapter supplied with the transmitter. If you require 1-5/8" EIA output on your Z7.5 or Z10 transmitter, please specify this when ordering.

Performance Specifications

Please refer to the appropriate Technical Data Sheet for detailed performance specifications of the Platinum Z transmitter.

INSTALLATION CONSIDERATIONS

The following sections provide useful information to assist in planning and installing the Z transmitter. Prior to installation, the exciter and transmitter technical manuals should be studied carefully to obtain a thorough understanding of the principles of operation, circuitry and nomenclature. This will facilitate proper installation and initial checkout.

Transmitter Cooling Requirements

The Z series transmitters are designed to operate in an environment with an intake air temperature between 0°C and +50°C. Dirt is the number one enemy of solid-state transmitters and a properly designed cooling system with adequate filtering is very important. The Z transmitter air system is designed to supply sufficient air at the required static pressure to cool the transmitter only. Additional pressure losses introduced by exhaust systems and air supply duct work must be offset by means other than the transmitter blowers. These inlet and exhaust system ducts generally need to be installed with helper fans to offset these losses. Refer to the Outline Drawings included for detailed information on intake and exhaust air flow specifications. It is recommended that the station consult with an HVAC specialist to determine the requirements of intake and exhaust ducts in order to meet the flow volumes required by the transmitter. Outside air which contains salt or pollution must have those items removed by an adequate filtration system or a closed system must be used.

Figure 6 is an example of an air system that should be avoided. The system shown here would starve the transmitter for fresh air and proper cooling would not be expected in this situation.

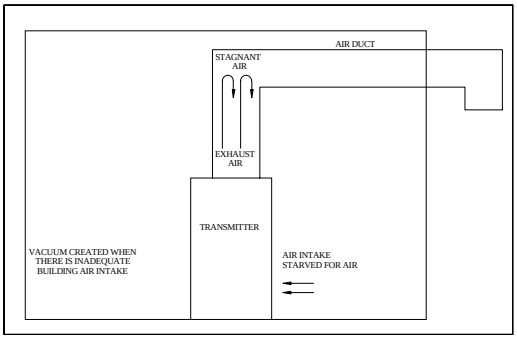


Figure 6
This air system is NOT recommended

Harris recommends the next two examples of air systems and the closed system will provide the cleanest air for the transmitter. In harsh environments a closed air system is recommended; that is, an air-conditioned room that re-circulates and properly filters the room air. In a closed air system there is normally no venting to the outside. The heat in the room is removed by the air conditioning unit. This is the ideal system in terms of room cleanliness. The operating cost of a closed system will depend on the amount of heat generated by the equipment, as well as environmental factors. The closed system may be your best choice if the outside air is salty, dirty, hot, or humid. However, if you choose to implement this system, you should include back-up ventilation to protect the facility in the event of an air conditioning unit failure.

With a closed system, the amount of air conditioning needed would be at least equal to the equipment's dissipated heat over and above the amount of cooling needed without the transmission equipment. The amount of heat that the equipment generates depends on the amount of power dissipated in heat into the transmitter room. Therefore, if you expect to be able to operate the transmitter into an air cooled test load without raising the room temperature, the air conditioning will have to be large enough to handle the full wattage consumed by the transmitter.

The conversion from watts dissipated in heat to BTU/hour is:

BTU/hour = Dissipated Power (kilowatts) X *3415*

TONS = BTU/hour ÷ 12,000

At reduced power, any FM transmitter will generate less heat, but not proportionately less. For example, a transmitter operating at half of its rated power will produce more than half of its dissipation at full power. This is because some circuitry consumes the same amount of power and other circuits become less efficient at reduced power levels. The total power consumption of your transmitter can be calculated by using the current and voltage values on the factory test data sheet. You may also contact the Harris Field Service Department. They can assist in determining the power consumption and efficiency of the transmitter especially at powers other than nameplate. Figure 7 is an example of a closed air system.

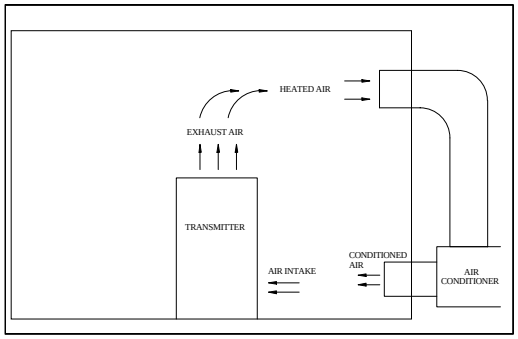


Figure 7
Closed Air System

Another configuration that keeps the transmitter adequately clean and properly ventilated is a positive pressure system. In this system outside filtered air is brought into the room using an air intake fan. Transmitter exhaust air is removed from the room using a duct hood over the transmitter with an assist fan. The exhaust assist fan should be sized about 5% larger than the transmitter CFM specifications. The building air intake fan should be sized 10-15% larger than the exhaust helper fan. The slight positive pressure in the room will ensure proper transmitter ventilation and will keep dust and dirt from entering the room through small leaks in the building.

The exhaust duct is best left detached from the transmitter by about six inches, similar to a range hood. This will allow a path for the exhaust air in the event the assist fan fails or the exhaust duct becomes blocked. The positive pressure system is only adequate in environments where the maximum outside air temperature does not exceed 50° C. While the transmitter is specified to operate up to 50° C it is best to try and keep the transmitter air inlet temperature to no more than 30° C.
Figure 8 is an example of a positive pressure system.

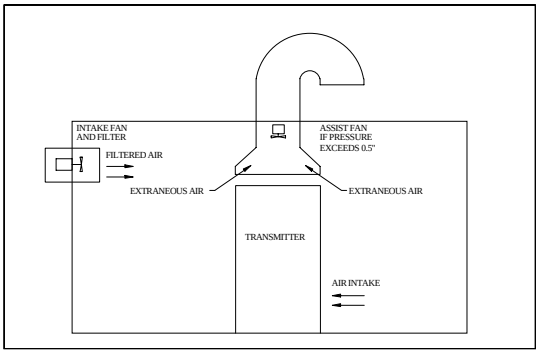


Figure 8
Positive Pressure System

A hybrid air system includes both air conditioning and ventilation of the transmitter exhaust to the outside. Typically, the air intake of the transmitter (rear) is located near the filtered air intake of the building. The exhaust air of the transmitter (top) is removed as described in the positive pressure system. The front portion of the transmitter room is cooled with air conditioning. A second hybrid method is to build a wall along the front of the transmitter isolating the front of the transmitter from the rear. The rear portion of the building is set up as a positive pressure system while the front is air conditioned. Figure 9 shows an example of a hybrid system.

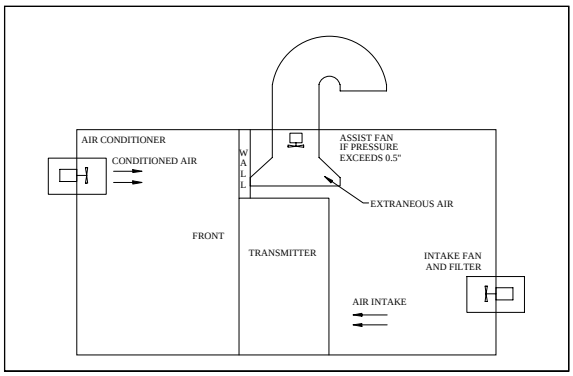


Figure 9
Hybrid System

Harris recommends consulting with your HVAC specialist to determine the requirements for your particular site.

Transmitter Placement

The transmitter will require a fairly level surface to rest on. If the transmitter is not on a level surface a level and shims should be used in order to ensure the unit is level and stable before continuing the installation. The transmitter should be placed with AC power and signal connections in mind. The sidewalls of the FM transmitter may be placed against a wall or other equipment, access to the sides of the transmitter is not required. Complete access is through the front and rear of the transmitter. The floor must be capable of supporting a load of 250 pounds per-square-foot (1221 kg per-square-meter). The power supplies roll out the front of the transmitter for system maintenance. Therefore, the transmitter should not be set up on 4X4 blocks or similar supports. Be sure to have a smooth flat surface in front of the transmitter of at least 36 inches for power supply maintenance. For Dual transmitter installations be sure transmitter A is positioned on the left and transmitter B is positioned on the right, as you view the system from the front. Refer to the Outline Drawings provided at the end of the manual for complete dimensions and weights for the transmitter of interest.

Single Phase Transmitters

The single phase Z7.5 and Z10 transmitters require two cabinets, for the larger single phase power supply components. The left hand cabinet holds the controller, power amplifiers, and two power supplies. The right hand cabinet will house the two remaining power supplies. One advantage of the second cabinet is that the upper two thirds of the cabinet is empty and configured as standard 19" EIA rack space for mounting auxiliary equipment. Refer to the Outline Drawing included for detailed dimensions.

Power Supply Installation

All Z series transmitters can be configured with either a single phase or three phase power supply. The transmitter is shipped with the power supplies in place. The power transformers will be tapped at the factory for the primary AC voltage that is specified at the time the order is taken. This voltage will be documented in the factory test data accompanying the transmitter and tagged at the main contactor input at the rear of the transmitter. The line voltage at the site should be measured to ensure it matches the tagged voltage. If a change is required the input voltage strapping chart is shown on the Overall System Block Diagram in the drawing package included with the transmitter.

Transmitter AC Input Wiring

The Z series transmitters can be configured for the following AC line configurations:

- 190-250 VAC, 3-phase, 50/60 Hz, 3-wire plus ground
- 360-415 VAC, 3-phase, 50/60 Hz, 4-wire
- 190-250 VAC, 1-phase, 50/60 Hz, 2-wire plus ground

The AC input wiring should be in agreement with local electrical codes. The AC mains wiring, disconnect and fuses should be sized for the transmitters full rated output power to accommodate future TPO changes. An AC primary disconnect or means to completely de-energize the transmitter primary circuit for servicing is required. Harris recommends a fused disconnect for the transmitter primary AC power feed(s). Fuses will provide improved long term reliability and nuisance free service over a circuit breaker with an equal rating. The recommended fuse type is a class RK5, a dual element time delay fuse. Examples of an RK5 fuse are the Bussmann FRN-R (250V), FRS-R (600V), Littelfuse FLNR (250V), FLSR (600V), and Ferraz gG

fuses. If you prefer to use a circuit breaker in your installation, select one with a motor-starting trip curve similar to that of the RK5 curve for fuses. This type of delayed response is needed in order to accommodate the momentary in-rush current when the transmitter is turned on.

The AC power source for the transmitter should be a low impedance, 50/60Hz, three phase or dual feed single phase depending on the type of power supply, with sufficient capacity to operate the transmitter at its maximum rated output power. The current ratings, nominal fuse sizes and wire gauges for typical AC line configurations are listed in the Electrical, Mechanical and Cooling data sheets included. The single phase Z7.5 and Z10 require a dual single phase feed to each transmitter cabinet. The fuse ratings in the Electrical, Mechanical and Cooling data sheets are rated for each feed, not both. Each cabinet is fused separately.

The AC input wiring terminates at the top of the AC mains contactor K1. K1 is located at the top right side in the rear of the cabinet as shown in figure 10. There are knockouts for AC power and control cables at the top, bottom and sides of the transmitter. See the outline drawings included for detailed dimensions and locations of these knockouts.

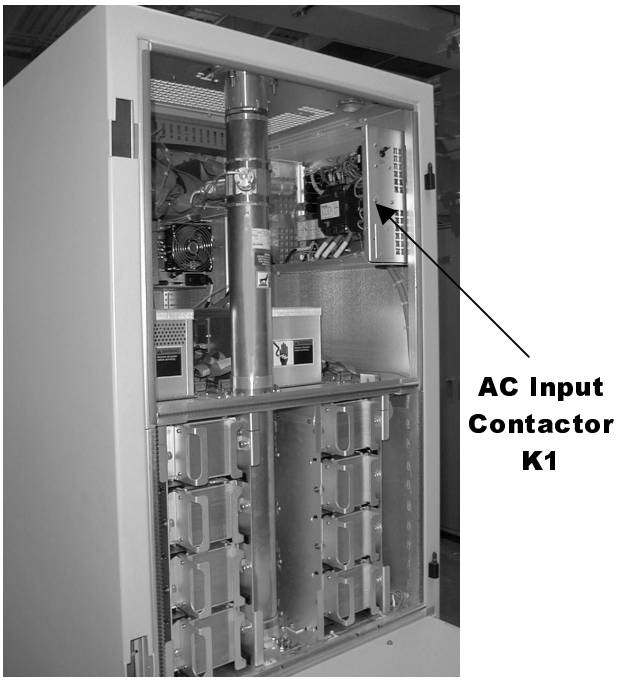


Figure 10
AC Mains Input at K1

In 4-wire WYE systems a large standoff is located near the main AC contactor K1 for the NEUTRAL connection. The neutral connection is important in this configuration. The system load is not perfectly balanced, requiring neutral current to maintain proper phase to neutral voltages. A poor neutral connection could cause damage to elements in the transmitter.

Transmitter Grounding

The importance of a good grounding system and lightning protection can hardly be overemphasized for reasons of personnel safety, protection of the equipment, and equipment performance. Lightning and transient energy via the power line or tower connections can impose serious threats to your personal safety as well as damage to the equipment. A ground system that has been in place for a long period of time can deteriorate and should be inspected periodically. This is especially true at the point where the ground strap enters or exits the building. All ground connections should be bolted and brazed together. This low impedance path will help carry lightning or transient current directly into the ground instead of into your equipment.

The basic elements of a ground system should include substantial grounding of tower guy wires (at each anchor point) and each tower leg using 8-10 foot copper ground rods. Ensure the power company has provided proper grounding of the AC mains power at the site as well. While there are different schools of thought on grounding techniques the star point grounding system is commonly used in broadcasting. In a star point ground system there is one common or star point where all grounds join together at a single point. This point is often a selected point along a ground system that encircles the building using copper strap and multiple ground rods. The number of ground rods will depend on soil conductivity and the size of the building. The interior of the building should have a common ground system made up of 2 or 4 inch copper ground strap, this ground should be tied to the outside star point and the AC mains ground should be connected to the star point. All coaxial cables should enter and exit the building at a single entry point and their shield(s) should be connected to a ground plate, which is then connected to the star point. Harris can provide copper ground strap, copper screen and bulkhead entrance ports for your site.

All Z series transmitters come with a 3-foot length of 2-inch copper ground strap, which can be connected to your site ground system. Figure 11 shows this strap which is located at the left rear side of the transmitter as viewed from the back and is connect to the transmitter chassis.

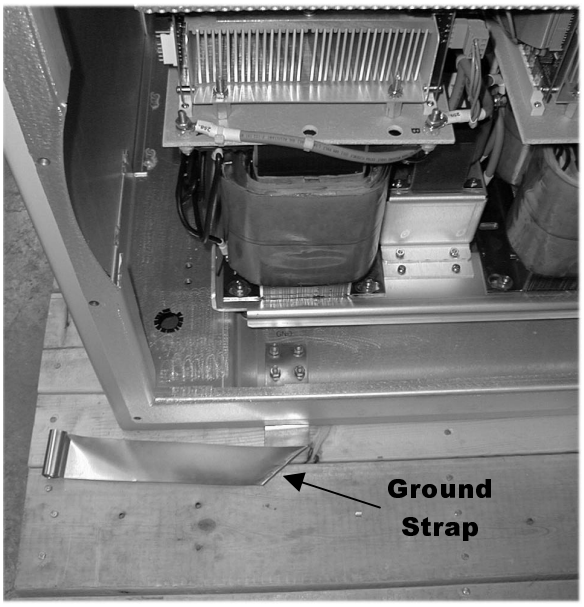


Figure 11
Ground Strap Connection

Surge Protection

Surge protection is an important component of any transmission system. The Z series transmitters are designed with built-in MOV surge protection, providing an added level of protection for the transmitter. However, the transmitter and other site equipment are best protected by a transient voltage surge suppressor (TVSS). The TVSS should be connected at the sites AC mains entrance and connected to ground using a copper ground strap in addition to the standard ground wire provided by your electrician. There are many levels of TVSS protection that can be employed depending on the condition of the source power. Harris recommends a parallel shunt surge protector as a minimum level of protection at all sites. A few recommended TVSS units which provide adequate protection in most cases are listed in the accessory section of this manual. More sophisticated series/parallel devices are available from Harris if needed. You may contact your Sales Representative for more information regarding products and pricing.

Remote Control Interface

The Z series transmitters include a standard parallel remote control interface, allowing the transmitter to be operated and monitored with a standard remote control system. If the transmitter is to be remotely controlled, it is important to initiate regular, thorough inspection and maintenance procedures at the transmitter location. Installation of equipment to monitor the room temperature at the remote transmitter site is also recommended. A screw terminal strip is used to terminate all remote control connections. The terminal strip converts to a D-connector which interfaces with the transmitter controller. The terminal strip is located on the upper left side wall as viewed from the rear of the. Figure 12 shows the location of the terminal strip.

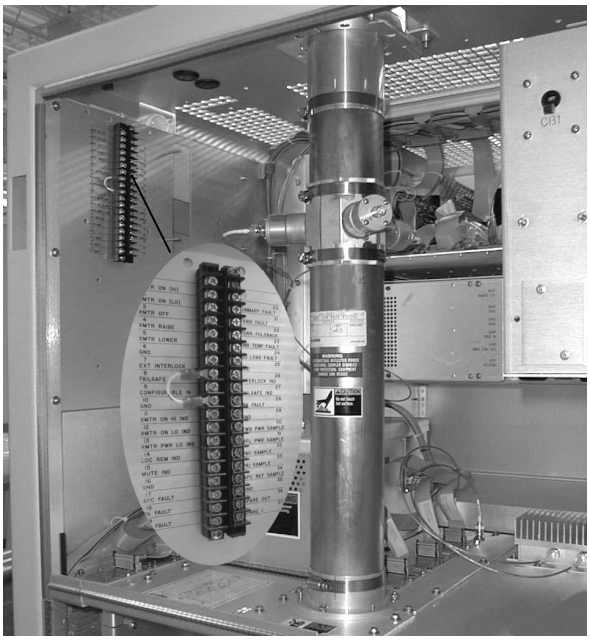


Figure 12
TB1 Terminal Strip

1 XMTR ON (HI)	X		
2 XMTR ON (LO)	X	X	20 SUMMARY FAULT
3 XMTR OFF	X	X	21 VSWR FAULT
4 XMTR RAISE	X	X	22 VSWR FOLDBACK
5 XMTR LOWER	X	X	23 AMB TEMP FAULT
6 GND	X	X	24 ISO LOAD FAULT
7 EXT INTERLOCK	X	X	25 GND
8 FAILSAFE	X	X	26 INTERLOCK IND
9 CONFIGURABLE IN	X	X	27 FAILSAFE IND
10 GND	X	X	28 IPA_FAULT
11 XMTR ON HI IND	X	X	29 GND
12 XMTR ON LO IND	X	X	30 FWD PWR SAMPLE
13 XMTR PWR LO IND	X	X	31 RFL PWR SAMPLE
14 LOC REM IND	X	X	32 PAV SAMPLE
15 MUTE IND	X	X	33 PAI SAMPLE
16 GND	X	X	34 APC REF SAMPLE
17 AFC FAULT	X	X	35 GND
18 PA FAULT	X	X	36 SPARE OUT
19 PS FAULT	X	X	37 SPARE 1

Figure 13
Remote Terminal Block Layout

The layout of the terminal block and the commands, status and metering outputs are shown in figure 13.

Always use shielded cable for the remote control cabling and if possible this wiring should be run through grounded metal conduit for added RFI protection.

Remote input control lines are standard ground switching inputs. Relay contact or open collector transistor switching can operate the inputs. Figure 14 shows two examples of typical switching circuits used for command inputs.

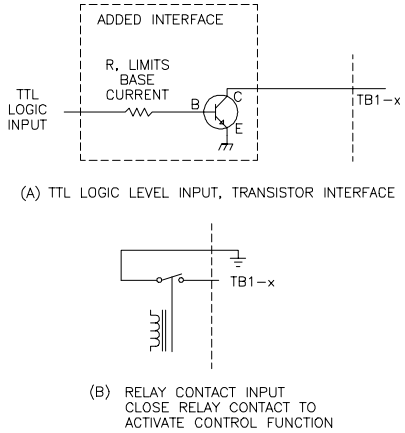


Figure 14
Control Input Circuits

The transmitter status output lines are transistor open collector outputs. A series 1.3 kΩ resistor and LED can also be used for extended status indications. Maximum external supply voltage should not exceed +28VDC. It should be noted the maximum status line current is 25mA. If the output is used to drive a small printed circuit board type relay, check the current requirements for the relay coil and be sure to install a reverse biased protection diode across the coil. A 1N4004 or equivalent will work.

EXCITER INTERFACE INFORMATION

Interface Wiring

The exciters are mounted in the Z transmitter with all AC power, control and RF connections made at the factory. RF interference may be an issue at some sites especially those co-located with an AM transmission systems. To help reduce the possibility of RF interference at the exciter's audio input, triaxial cable can be used for the analog composite run. Triaxial cable includes a center conductor and two isolated shields, unlike double shielded coax where the two shields are touching each other. The outer shield is used as an RFI shield and the inner shield is used in the normal fashion. Triaxial cables of specific lengths terminated with BNC connectors and ground lugs on the outer shield can be ordered from the Harris Parts Department.

The following table provides lengths and associated part numbers:

Triaxial Cables for Composite and SCA Interface	
Triaxial Cable Length	**Harris Part Number**
3 Ft.	922-0014-001
5 Ft.	922-0014-002
10 Ft.	922-0014-003
15 Ft.	922-0014-004
25 Ft.	922-0014-005
40 Ft.	922-0014-006

If the transmitter is fitted with a DIGIT CD exciter using the Digital Interface Module, 110Ω AES3 standard cable should be used to eliminate high frequency roll-off of the digital signal. The AES3 cable can be run in lengths up to 500 feet.

This cable and XLR connectors can be purchased from Harris using the following parts numbers:

Belden AES3 Twisted Pair Cable / XLR connectors	
Harris Part Number	**Description**
BLD1800B	Single Twisted Pair Cable
BLD1802A	Dual Twisted Pair Cable
NUTNC3MX	3 Pin XLR plug (for digital I/O input)
NUTNC3FX	3 Pin XLR jack

DIGIT® CD Specifications

The following is a list of DIGIT CD exciter interface specifications that can be used to plan the integration of processing, STL and SCA equipment for your installation. More detailed specifications are available in the Technical Data Sheet for the exciter being used.

General

Power Output: 1-55 watts, user adjustable
RF Output Connector: BNC jack
RF Output Impedance: 50Ω
Frequency Range: 87 to 108MHz
AC Input Power: 90 to 132VAC or 180 to 246VAC, 50/60Hz

Analog Interface Module

Composite Input

Input Connectors: (2) BNC jack
Impedance: 10kΩ; selectable balanced/unbalanced
Input Level: 3.5vp-p for ± 75kHz deviation

Mono Audio Input
Input Connector: (1) 3 terminal XLR jack
Impedance: 600Ω; balanced
Input level: +10dBm nominal for ± 75kHz deviation (adjustable)

SCA Inputs
Input Connectors: (3) BNC jack
Input Impedance: 10kΩ, unbalanced
Input level: 1.5vp-p for ± 7.5kHz deviation

DIGIT CD Digital Interface Module

Digital Input
Input Connector: (1) 3 terminal XLR jack
Input Impedance: 110Ω, balanced
Input Format: AES3-1992
Input sample rate: Any in range of 32kHz to 56kHz
Input level: 0 to –18dBfs
Input pre-emphasis: 0, 25, 50, or 75µs, user selectable
RDS Sychronization Output: 19kHz pilot sample

SCA Inputs
Input Connectors: (3) BNC jack
Input Impedance: 10kΩ, unbalanced
Input level: 1.5vp-p for ± 7.5kHz deviation

SuperCiter™ Specifications

General
Power Output: 1-55 watts, user adjustable
RF Output Connector: BNC jack
RF Output Impedance: 50Ω
Frequency Range: 87.5 to 108MHz
AC Input Power: 90 to 132VAC or 180 to 246VAC, 50/60Hz

Composite Audio Inputs
Input Connectors: (1) BNC jack
Impedance: 10kΩ or 50Ω selectable; balanced/unbalanced
Input Level: 3.5vp-p for ± 75kHz deviation

Mono Audio Input
Input Connector: (1) 3 terminal XLR jack
Impedance: 600Ω; balanced
Input level: +10dBm nominal for ± 75kHz deviation (adjustable)

SCA Inputs
Input Connectors: (3) BNC jack
Input Impedance: 10kΩ, unbalanced
Input level: 1.5vp-p for ± 7.5kHz deviation

SERVICE & PARTS

Harris offers complete service support of the transmitter including pre-installation assistance by Harris Applications Engineering, installation and check-out services and complete transmitter training courses. Harris also provides 24 hour per day 365 day per year parts and technical support.

Field Services

Routine service includes installation, installation check-outs, proof of performance measurements and transmitter updates. To schedule a visit, you may phone the Service Department at (217) 221-7528 Monday through Friday from 8:00a.m. to 5p.m. U.S. Central Standard Time. Non-emergency Field Service visits should be planned at least two weeks in advance to allow proper planning and preparation for the service visit.

- ***Installation:*** Service Engineers are available to perform complete on site installation of your transmitter. When ordering installation the Service Department will need detailed information about your facility; is the new transmitter replacing an older transmitter, will a remote control be installed, is there a back-up transmitter, etc. An equipment list and building mechanical layout drawings showing the location of all equipment is very helpful.

- ***Check-Outs:*** If the transmitter is installed by station staff or representatives you may still have a Harris Service Engineer perform an operational check-out and/or proof of performance of the transmitter. A detailed equipment list of what will be tested is always important to ensure the service engineer is properly prepared.

Telephone Support Service

The Radio Field Service Department provides telephone support service of Harris radio transmitters. During normal business hours the Radio Field Service Department can be reached at (217) 221-7528. Emergency service after normal business hours is available through the parts department if your station is off the air, operating at reduced power or if have urgent questions during a new installation. The parts department can be reached at (217) 221-7500. A representative will gather pertinent information, contact a Field Service Engineer and the Engineer on duty will call you to assist. To ensure that you get the best assistance as fast as possible you should have the following items before calling Harris:

- Transmitter factory test data sheet
- Technical manual and drawing package
- A list of all transmitter current meter readings and fault log information

Parts

The Service/Parts department can be reached at (217) 221-7500 24 hours a day 365 days a year. Harris stocks a large inventory of parts for your transmitter and in most cases will have parts to you overnight or parts can also be flown counter to counter. Normal business hours are 8:00am to 5:00pm Monday through Friday (U.S. Central standard time). It is important to have the Harris ten digit part numbers and shipping information in hand when calling the parts department. This will ensure fast and accurate orders.

Returns and Exchanges

Damaged or undamaged equipment should not be returned unless written approval and a Return Authorization is received from Harris. You may receive a return authorization by contacting the parts department at (217) 221-7500. The parts representative will give you a return authorization number and shipping instructions. Complete details regarding circumstances and reasons for return should be included in the request for return. All returns will be sent freight prepaid and properly insured by the customer. When communicating with Harris, specify the order number, invoice number or return authorization number.

TRAINING SERVICES

How your transmission equipment is operated and maintained is as important to its long-term reliability as how it was designed and manufactured.

Each year the Harris training center offers a wide variety of scheduled programs for engineers with all levels of experience. Our goal is to give stations the skills and knowledge needed to ensure long life and top performance of Harris RF transmission equipment.

Harris offers general RF training as well as courses on specific Harris product lines. General training programs are ideal for personnel who recently have been given responsibility for testing, maintaining and servicing the station's transmission equipment. You will find our general RF training programs very helpful. The general training programs are offered fours times per year. There are six classes offered:

- AM transmitter workshop
- FM transmitter workshop
- TV transmitter workshop
- RF Circuits I and II and Digital Control Logic.

The general RF training programs combine theory with hands-on practice, class size is limited and early enrollment is necessary. Regular classes are offered at the Quincy, Illinois Broadcast Technology Training Center. Specific product training focuses in detail on specific families of Harris transmitters and Control products. The Z series product training course is offered twice per year.

For complete information and training schedules please call (217) 222-8200 between 8:00a.m. to 5:00p.m., Monday through Friday, U.S. Central Standard Time.

INSTALLATION ACCESORIES

The following page is a list of installation accessories and part numbers that are typically used when installing and maintaining the Harris Z series transmitters. Your Harris District Sales Manager can provide you with information regarding detailed transmitter options and any additional equipment needed to complete your installation.

Transmitter Installation Accessories

GROUNDING MATERIAL & TRANSMISSION LINE COMPONENTS	
Harris Part Number	**Description**
003-4010-045	Copper Ground Strap; 0.02" x 2.0"
003-4010-050	Copper Ground Strap; 0.02 x 4.0"
359-1053-000	2.0" Plastic coated hangers (for internal line)
359-1054-000	3.5" Plastic coated hangers (for internal line)
359-1055-000	4.0" Plastic coated hangers (for internal line)
618-0368-000	Myatt 20' 1-5/8" flanged line section
618-0305-000	Myatt 20' 1-5/8" un-flanged line section
620-0276-000	Myatt 1-5/8" flange adapter, un-pressurized, clamp type
620-0662-000	Myatt 1-5/8" coupling sleeve, un-pressurized, clamp type
620-1903-000	Myatt 1-5/8" 90° flanged elbow, reinforced inner
620-0631-000	Myatt 1-5/8" 90° un-flanged elbow, reinforced inner
620-0573-000	Myatt 1-5/8" anchor insulator connector
620-0233-000	Myatt 1-5/8" hardware set, stainless steel
618-0387-000	Myatt 20' 3-1/8" flanged line section
618-0228-000	Myatt 20' 3-1/8" un-flanged line section
620-0498-000	Myatt 3-1/8" flange adapter, un-pressurized, clamp type
620-0581-000	Myatt 1-5/8" coupling sleeve, un-pressurized, clamp type
620-1893-000	Myatt 3-1/8" 90° flanged elbow, reinforced inner
620-2275-000	Myatt 3-1/8" 90° un-flanged elbow, reinforced inner
620-0544-000	Myatt 3-1/8" anchor insulator connector
620-0908-000	Myatt 3-1/8" hardware set, stainless steel

SURGE PROTECTION		
Harris Part Number	**LEA Model Number**	**Line Configuration**
740-1175-000	LEA DS1G-120/208-3Y	208V 4-WIRE WYE
740-1176-000	LEA DS1G-225-3D	200-240V 3-WIRE DELTA
740-1177-000	LEA DS1G-220/380-3Y	380V 4-WIRE WYE
DS1G240/4153Y	LEA DS1G-240/415-3Y	415V 4-WIRE WYE
740-1101-000	LEA DS1G-120/240-SP	1-PH FROM SPLIT 230V
740-1102-000	LEA DS1G-240-1	1-PH LEG-LEG 200-240V

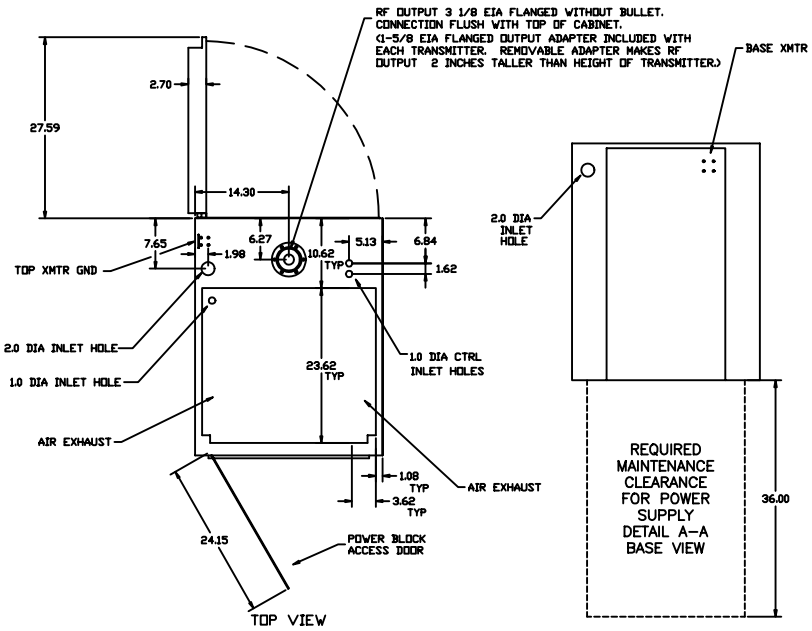
Z SERIES TRANSMITTER SPARE PARTS	
Harris Part Number	**Description**
992-9521-002 [1]	850 watt PA module assembly
992-9261-002 [1]	425 watt PA amplifier assembly
992-9767-001 [2]	Semiconductor & Fuse Kit for 1-phase supply
992-9767-003	Semiconductor & Fuse Kit for 3-phase supply
992-9766-001 [2]	Service parts kit
992-9768-002 [2]	Spare boards kit
992-9516-002	Life Support control board
DIGIT CD SPARE PARTS	
990-1130-001	Semiconductor kit for Analog Input Module
990-1133-001	Semiconductor kit for Digital Input Module
994-9515-001	Service parts kit
994-9516-001	Spare boards kit
SuperCiter SPARE PARTS	
992-9790-001	Semiconductor kit
992-9792-001	Service parts kit
992-9791-001	Spare boards kit

Notes:

1 If you currently own a Z series transmitter refer to the transmitter service manual for the correct part number for the amplifier in your transmitter. Two versions are available, an 001 and an 002.

2 If you currently own a Z series transmitter please specify the model and power supply configuration when ordering control boards. This will ensure proper firmware configuration.

Harris Corporation, Broadcast Communications Division
Quincy Manufacturing Facility
3200 Wismann Lane
Quincy, IL 62301
Phone: (217) 222-8200
Fax: (217) 222-9443



	TOTAL DISSIPATION	OUTPUT POWER	OVERALL EFFICIENCY	WEIGHT 3 PHASE	WEIGHT 1 PHASE
Z5	3,333 W (11,374 BTU)	5,000W	60%	1300 LBS 590 KGS	1395 LBS 633 KGS
Z3.5	2,300W (7,850 BTU)	3,500W	60	1280 LBS 582 KGS	1375 LBS 625 KGS
Z2	2,600W (8,871 BTU) .	2,600W 2,000W	50 43	1130 LBS 514 KGS	1225 LBS 557 KGS

CABINET HEAT RADIATION 5% OR LESS OF TOTAL DISSIPATION

INLET AIR TEMPERATURE MUST NOT EXCEED 50 DEGREES CENTIGRADE AT SEA LEVEL. DERATE AT 2 DEGREES CENTIGRADE PER 1,000 FEET ELEVATION.

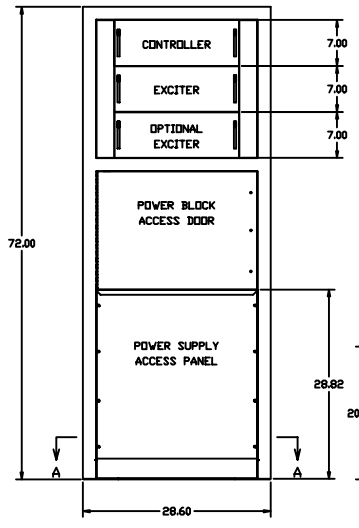
MINIMUM AIR FLOW INTAKE(50/60Hz)
LOW SPEED: 700 CFM [20 CMM]
HIGH SPEED: 1200 CFM [34 CMM]
EXHAUST FLOW (ESTIMATE 10% LEAKAGE)
LOW SPEED: 630 CFM [17.8 CMM]
HIGH SPEED: 1080 CFM [30.5 CMM]

UNDER NORMAL OPERATING CONDITIONS BLOWER SPEED IS "LOW".

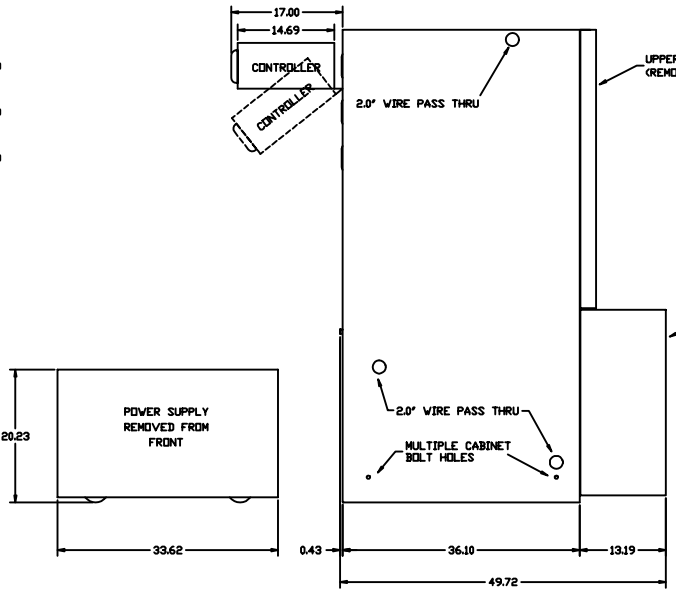
EXHAUST DUCT MUST NOT INDUCE ANY BACK PRESSURE TO TRANSMITTER AIR SYSTEM

IF EXHAUST DUCT AND FAN ARE INSTALLED STATIC PRESSURE IN EXHAUST HOOD MUST BE BETWEEN 0.0" AND −0.01" [0.25 MM] H 0

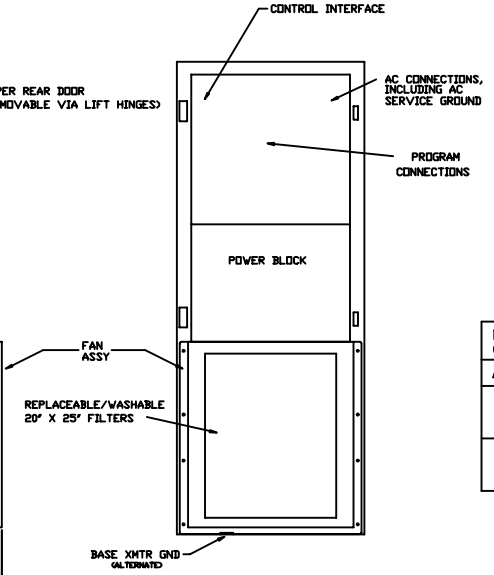
		Z5 (Z2 REDUNDANT)			Z3.5			Z2		
	NOMINAL LINE VOLTAGE	AVERAGE LINE CURRENT	FUSE SIZE	MINIMUM WIRE SIZE	AVERAGE LINE CURRENT	FUSE SIZE	MINIMUM WIRE SIZE	AVERAGE LINE CURRENT	FUSE SIZE	MINIMUM WIRE SIZE
3ø 3 WIRE	208	24	40A	8 AWG (8 mm2)	17	40A	8 AWG (8 mm2)	13	20A	12 AWG (3 mm2)
	220	23	40A	8 AWG (8 mm2)	16	40A	8 AWG (8 mm2)	12	20A	12 AWG (3 mm2)
	240	21	40A	8 AWG (8 mm2)	15	40A	8 AWG (8 mm2)	11	20A	12 AWG (3 mm2)
3ø 4 WIRE NOTE 2	360	14	20A	10 AWG (5 mm2)	10	20A	10 AWG (5 mm2)	7.5	20A	12 AWG (3 mm2)
	380	13	20A	10 AWG (5 mm2)	9	20A	10 AWG (5 mm2)	7	20A	12 AWG (3 mm2)
	416	12	20A	10 AWG (5 mm2)	8	20A	10 AWG (5 mm2)	6.5	20A	12 AWG (3 mm2)
1ø	208	47	70A	6 AWG (13 mm2)	35	70A	6 AWG (13 mm2)	28	40A	8 AWG (8mm2)
	220	45	70A	6 AWG (13 mm2)	33	70A	6 AWG (13 mm2)	27	40A	8 AWG (8mm2)
	240	41	70A	6 AWG (13 mm2)	30	70A	6 AWG (13 mm2)	25	40A	8 AWG (8mm2)



FRONT VIEW



SIDE VIEW



REAR VIEW
WITH REAR FILTER DOOR REMOVED

IMPORTANT: YOUR AC MAINS DISCONNECT BOX SHOULD BE EQUIPPED WITH CLASS RK5 FUSES (DUAL ELEMENT TIME DELAY) OR AN EQUIVALENT MOTOR-STARTING CIRCUIT BREAKER

NOISE LEVEL MEASURED ONE METER FROM FLOOR AND ONE METER FROM TRANSMITTER, NORMAL CONDITIONS

AC LINE FREQ	LOW SPEED		HIGH SPEED	
50Hz	FRONT/SIDE	<65 dBA	FRONT/SIDE	<74 dBA
	REAR	<71 dBA	REAR	<80 dBA
60Hz	FRONT/SIDE	<68 dBA	FRONT/SIDE	<79 dBA
	REAR	<74 dBA	REAR	<85 dBA

NOTES:
1. SEE THE TECHNICAL MANUAL FOR A SPECIAL NOTE CONCERNING 360 TO 416 VOLT SYSTEMS.

REVISION	LTR	ZONE	DATE	DFTM	ENG	ECO NBR
	C	.	1-6-2001	MWS	JDB	P15401
	ADD DOOR THICKNESS DIMENSION (2.7)					
	B	.	12-7-00	.	JDB	.
	REVISED AIRFLOW DATA					

HARRIS CORPORATION
BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305

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TOLERANCES UNLESS NOTED
.X ± .030 .XX ± .015
.XXX ± .005 ANGLES ± 1 DEG
ALL √ INDICATES 125 MICRO INCH

ALL DIMENSION IN INCHES UNLESS OTHERWISE NOTED

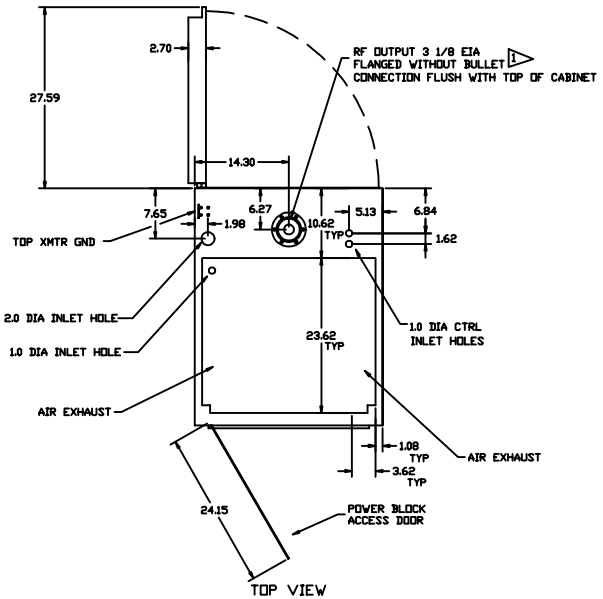
MUST COMPLY WITH WORKMANSHIP STANDARDS SPEC 817-1152-001

DRAWN BY	D BLICKHAN
DATE	OCT. 6, 2000
ENG CHK	-
PROJ ENG	D BLICKHAN
MFG ENG	M RUSSELL
E	SHEET 1 OF 1

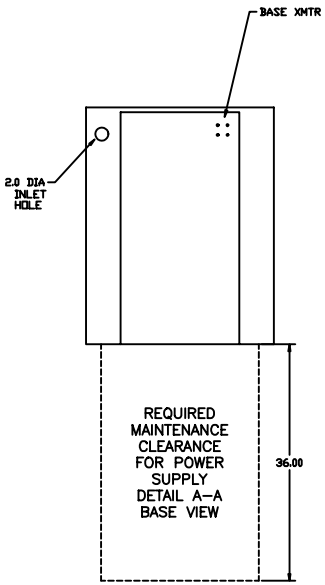
TITLE
OUTLINE DRAWING
Z5, Z3.5, Z2 FM TRANSMITTER
5KW/3.5 KW/2KW

DWG NO. 852 9199 031 . REV C

DWG NO. 852 9199 030 .



TOP VIEW



	TOTAL DISSIPATION	OUTPUT POWER	OVERALL EFFICIENCY	WEIGHT .
Z10	6,666 W (22,745 BTU)	10,000W	60%	1750 LBS 795 KGS
Z7.5	4,200W (14,330 BTU)	7,500W	64	1710 LBS 777 KGS

CABINET HEAT RADIATION 5% OR LESS OF TOTAL DISSIPATION

NOISE LEVEL MEASURED ONE METER FROM FLOOR AND ONE METER FROM TRANSMITTER, NORMAL CONDITIONS				
AC LINE FREQ	LOW SPEED		HIGH SPEED	
50Hz	FRONT/SIDE	<65 dBA	FRONT/SIDE	<74 dBA
	REAR	<71 dBA	REAR	<80 dBA
60Hz	FRONT/SIDE	<68 dBA	FRONT/SIDE	<79 dBA
	REAR	<74 dBA	REAR	<85 dBA

INLET AIR TEMPERATURE MUST NOT EXCEED 50 DEGREES CENTIGRADE AT SEA LEVEL. DERATE AT 2 DEGREES CENTIGRADE PER 1,000 FEET ELEVATION.

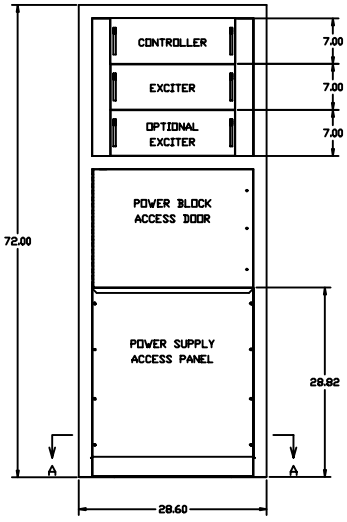
MINIMUM AIR FLOW INTAKE(50/60Hz)
LOW SPEED: 900 CFM [25.5 CMM]
HIGH SPEED: 1400 CFM [39.6 CMM]
EXHAUST FLOW (ESTIMATE 10% LEAKAGE)
LOW SPEED: 810 CFM [23 CMM]
HIGH SPEED: 1260 CFM [35.6 CMM]
UNDER NORMAL OPERATING CONDITIONS BLOWER SPEED IS "LOW".

EXHAUST DUCT MUST NOT INDUCE ANY BACK PRESSURE TO TRANSMITTER AIR SYSTEM

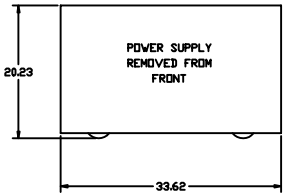
IF EXHAUST DUCT AND FAN ARE INSTALLED STATIC PRESSURE IN EXHAUST HOOD MUST BE BETWEEN 0.0" AND −0.01" [0.25 MM] H 0

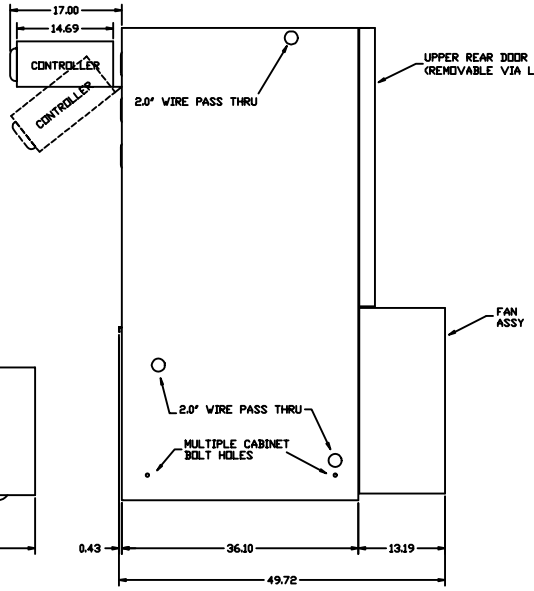
	NOMINAL LINE VOLTAGE	AVERAGE LINE CURRENT AT 10KW	AVERAGE LINE CURRENT AT 7.5KW	FUSE SIZE	MINIMUM WIRE SIZE
3ø 3 WIRE	208	48	34	80A	4 AWG (19 mm2)
	220	46	32	80A	4 AWG (19 mm2)
	240	42	30	80A	4 AWG (19 mm2)
3ø 4 WIRE NOTE 2	360	28	20	45A	8 AWG (8mm2)
	380	26	19	45A	8 AWG (8mm2)
	416	24	17	45A	8 AWG (8mm2)

IMPORTANT: YOUR AC MAINS DISCONNECT BOX SHOULD BE EQUIPPED WITH CLASS RK5 FUSES (DUAL ELEMENT TIME DELAY) OR AN EQUIVALENT MOTOR–STARTING CIRCUIT BREAKER

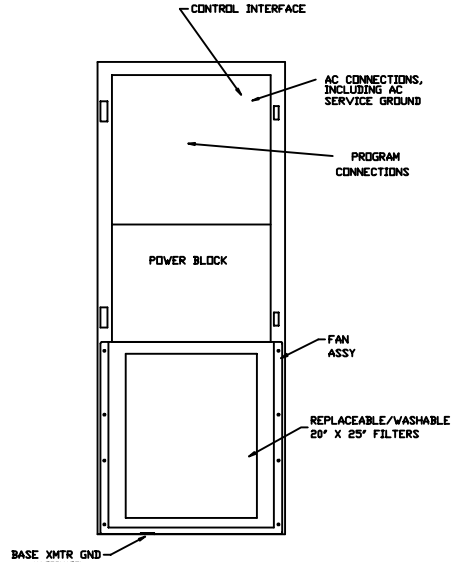


FRONT VIEW





SIDE VIEW



REAR VIEW
WITH REAR FILTER DOOR REMOVED

3 PHASE

NOTES:
1. MAY BE ORDERED AS 1-5/8 EIA FLANGED OUTPUT. (REMOVABLE ADAPTER MAKES RF OUTPUT 2 INCHES TALLER THAN HEIGHT OF TRANSMITTER.)
2. SEE THE TECHNICAL MANUAL FOR A SPECIAL NOTE CONCERNING 360 TO 416 VOLT SYSTEMS.

REVISION	LTR	ZONE	DATE	DFTM	ENG	ECO NBR
	C	.	1-6-2001	MWS	JDB	P15401
	ADD DOOR THICKNESS DIMENSION (2.7)					
	B	.	12-7-00	.	JDB	.
	REVISED AIRFLOW DATA					

HARRIS CORPORATION
BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305

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TOLERANCES UNLESS NOTED
.X ± .030 .XX ± .015
.XXX ± .005 ANGLES ± 1 DEG
ALL √ INDICATES 125 MICRO INCH

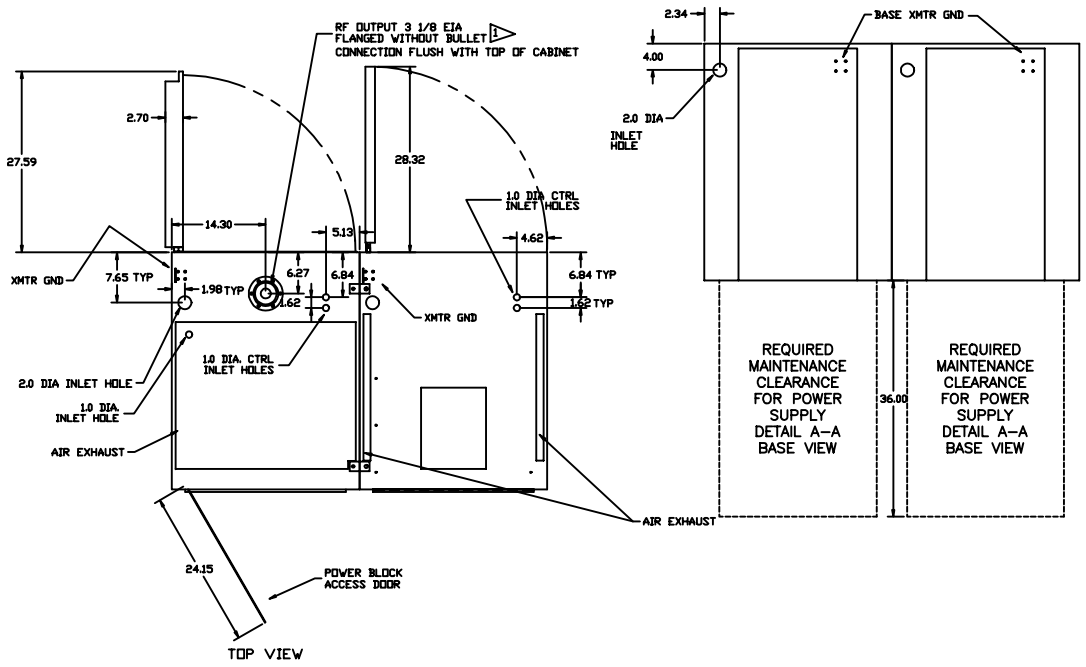
ALL DIMENSION IN INCHES UNLESS OTHERWISE NOTED
MUST COMPLY WITH WORKMANSHIP STANDARDS SPEC 817-1152-001

DRAWN BY	D BLICKHAN
DATE	SEPT. 25, 2000
ENG CHK	–
PROJ ENG	D BLICKHAN
MFG ENG	M RUSSELL
E	SHEET 1 OF 2

TITLE
OUTLINE DRAWING
Z10/Z7.5 FM TRANSMITTER
10KW/7.5 KW

DWG NO. 852 9199 030 . REV C

DWG NO. 852 9199 030 .



2.34
4.00
2.0 DIA INLET HOLE
BASE XMTR GND
REQUIRED MAINTENANCE CLEARANCE FOR POWER SUPPLY DETAIL A–A BASE VIEW
36.00
REQUIRED MAINTENANCE CLEARANCE FOR POWER SUPPLY DETAIL A–A BASE VIEW

	TOTAL DISSIPATION	OUTPUT POWER	OVERALL EFFICIENCY	WEIGHT
Z10	6,666 W (22,745 BTU)	10,000W	60%	2300 LBS 1045 KGS
Z7.5	4,200W (14,330 BTU)	7,500W	64%	2280 LBS 1027 KGS

CABINET HEAT RADIATION 5% OR LESS OF TOTAL DISSIPATION

NOISE LEVEL MEASURED ONE METER FROM FLOOR AND ONE METER FROM TRANSMITTER, NORMAL CONDITIONS				
AC LINE FREQ	LOW SPEED		HIGH SPEED	
50Hz	FRONT/SIDE	<65 dBA	FRONT/SIDE	<74 dBA
	REAR	<71 dBA	REAR	<80 dBA
60Hz	FRONT/SIDE	<68 dBA	FRONT/SIDE	<79 dBA
	REAR	<74 dBA	REAR	<85 dBA

INLET AIR TEMPERATURE MUST NOT EXCEED 50 DEGREES CENTIGRADE AT SEA LEVEL. DERATE AT 2 DEGREES CENTIGRADE PER 1,000 FEET ELEVATION.

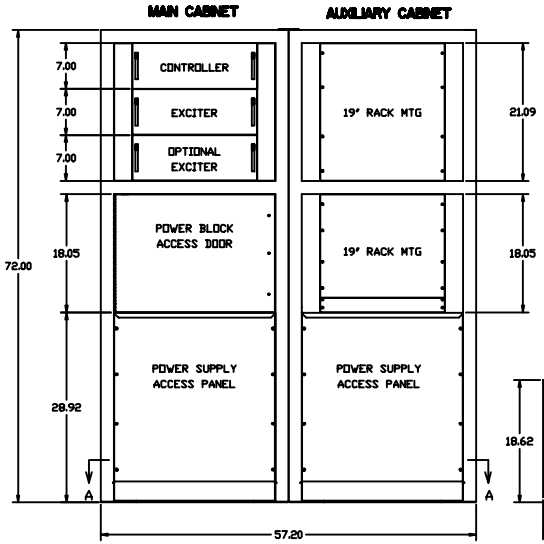
MINIMUM AIR FLOW INTAKE(50/60Hz)
LOW SPEED: 900 CFM [25.5 CMM]
HIGH SPEED: 1400 CFM [39.6 CMM]
EXHAUST FLOW (ESTIMATE 10% LEAKAGE)
LOW SPEED: 810 CFM [23 CMM]
HIGH SPEED: 1260 CFM [35.6 CMM]
UNDER NORMAL OPERATING CONDITIONS BLOWER SPEED IS "LOW".

EXHAUST DUCT MUST NOT INDUCE ANY BACK PRESSURE TO TRANSMITTER AIR SYSTEM

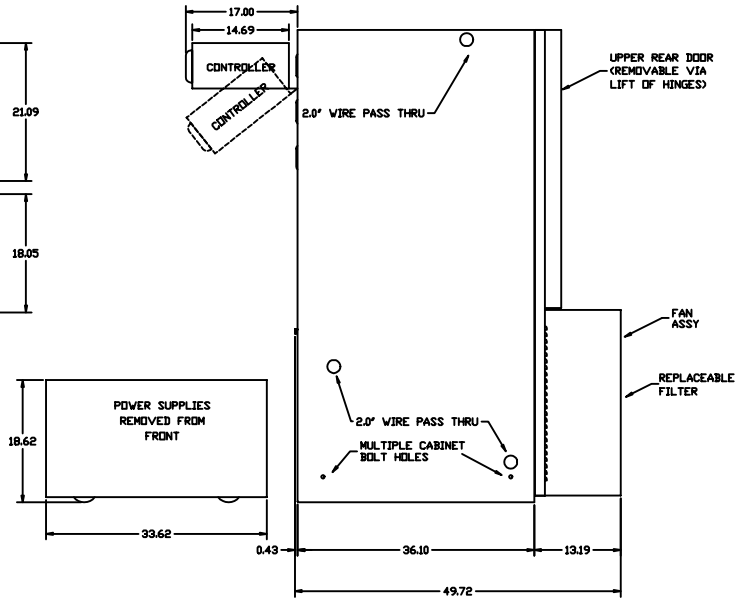
IF EXHAUST DUCT AND FAN ARE INSTALLED STATIC PRESSURE IN EXHAUST HOOD MUST BE BETWEEN 0.0" AND −0.01" [0.25 MM] H_2O

IMPORTANT: YOUR AC MAINS DISCONNECT BOX SHOULD BE EQUIPPED WITH CLASS RK5 FUSES (DUAL ELEMENT TIME DELAY) OR AN EQUIVALENT MOTOR–STARTING CIRCUIT BREAKER

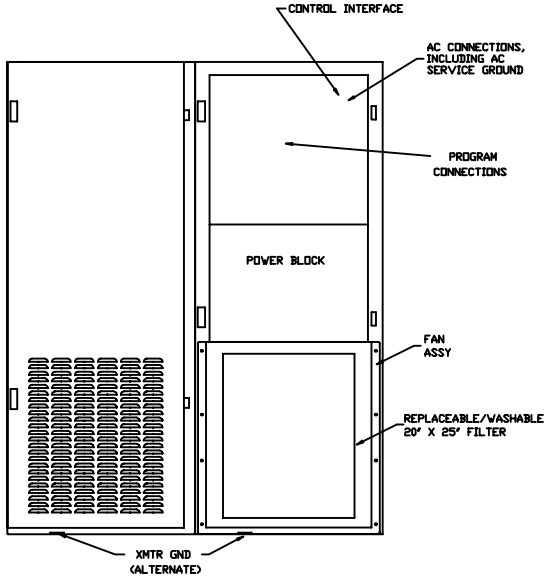
	NOMINAL LINE VOLTAGE	AVERAGE LINE CURRENT AT 10KW	AVERAGE LINE CURRENT AT 7.5KW	FUSE SIZE MAIN	FUSE SIZE AUXILIARY	MINIMUM WIRE SIZE EACH CABINET
1ø	208	93A	70A	75A	75A	6 AWG (13 mm2)
	220	67A	67A	75A	75A	6 AWG (13 mm2)
	240	81A	61A	75A	75A	6 AWG (13 mm2)



FRONT VIEW



SIDE VIEW



REAR VIEW
WITH REAR FILTER DOOR REMOVED

SINGLE PHASE

NOTES
1. MAY BE ORDERED AS 1-5/8 EIA FLANGED OUTPUT. (REMOVABLE ADAPTER MAKES RF OUTPUT 2 INCHES TALLER THAN HEIGHT OF TRANSMITTER.)

REVISION	LTR	ZONE	DATE	DFTM	ENG	ECO NBR
	C	.	1-6-2001	MWS	JDB	P15401
	ADD DOOR THICKNESS DIMENSION (2.7)					
	B	.	12-7-00	.	JDB	.
	REVISED AIR FLOW DATA					

HARRIS
HARRIS CORPORATION
BROADCAST COMMUNICATIONS
P.O. BOX 4290
QUINCY, ILLINOIS 62305

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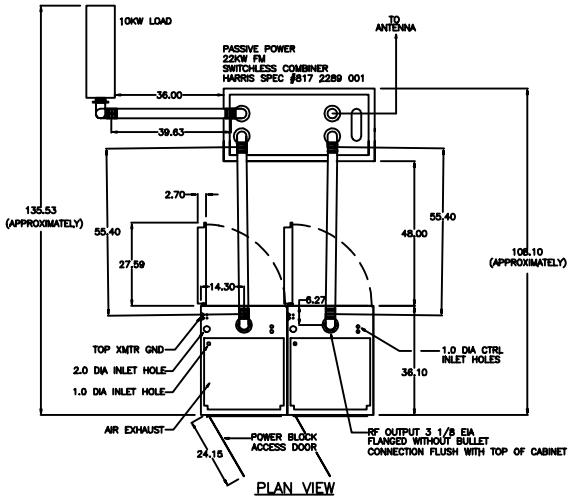
TOLERANCES UNLESS NOTED
.X ± .030 .XX ± .015
.XXX ± .005 ANGLES ± 1 DEG
ALL √ INDICATES 125 MICRO INCH

ALL DIMENSION IN INCHES UNLESS OTHERWISE NOTED
MUST COMPLY WITH WORKMANSHIP STANDARDS SPEC 817-1152-001

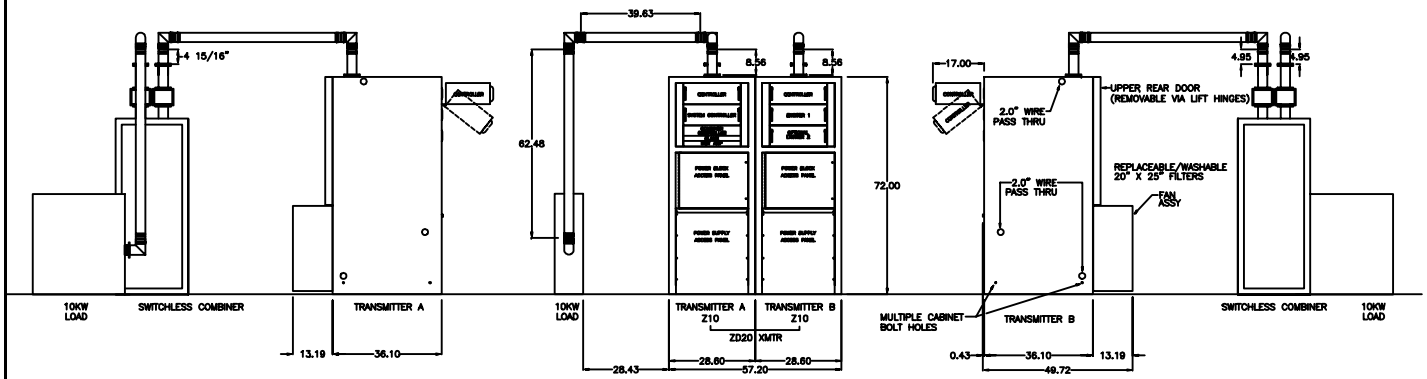
DRAWN BY	D BLICKHAN
DATE	SEPT. 25, 2000
ENG CHK	-
PROJ ENG	D BLICKHAN
MFG ENG	M RUSSELL
E	SHEET 2 OF 2

TITLE
OUTLINE DRAWING
Z10/Z7.5 FM TRANSMITTER
10KW/7.5 KW

DWG NO. 852 9199 030 . REV C



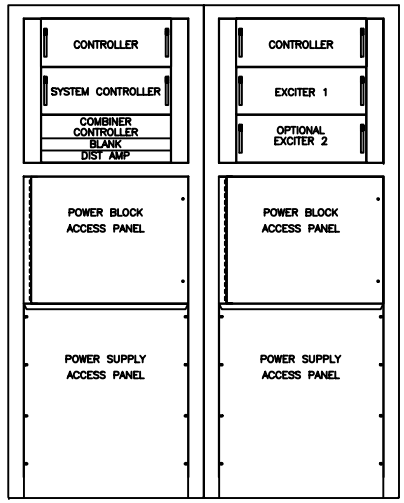
PLAN VIEW



LEFT SIDE VIEW

FRONT VIEW

RIGHT SIDE VIEW



TRANSMITTER A TRANSMITTER B

ENLARGED FRONT VIEW
(NOT TO SCALE)

NOTES

REVISION	LTR	ZONE	DATE	DFTM	ENG	ECO NBR
	A	.	.	.	.	NEW DWG
	.					
	.	.	.	.	.	.
	.					

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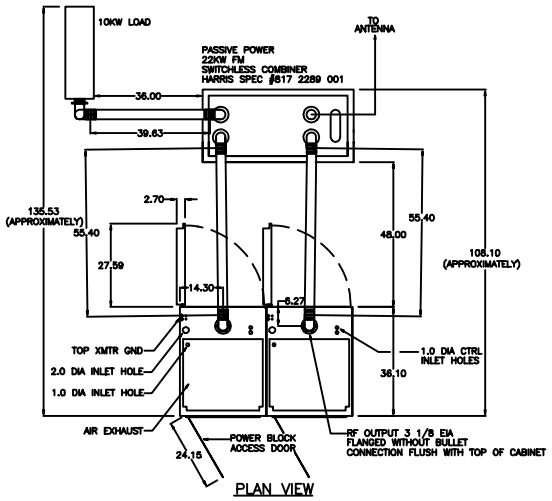
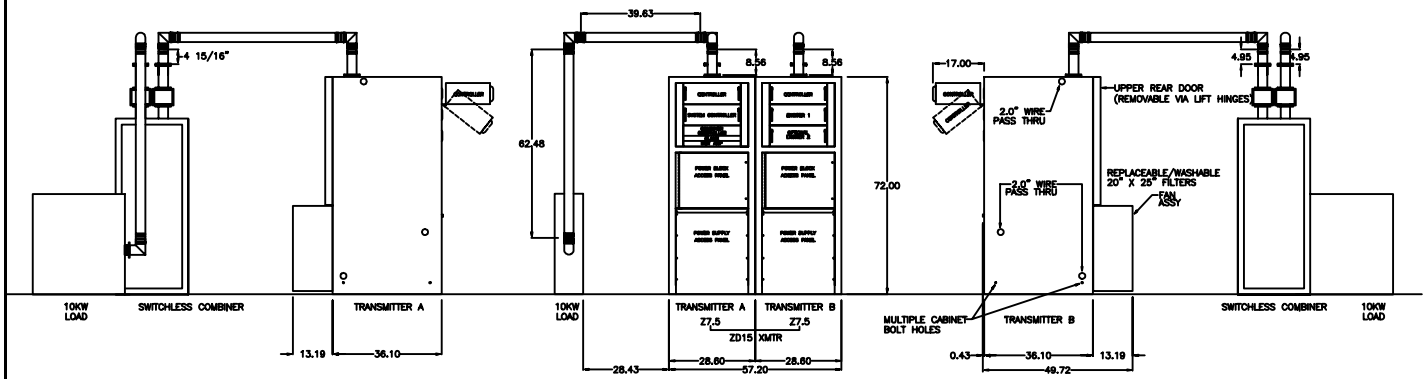
DRAWN BY	K GLASCOCK
DATE	1/3/01
ENG CHK	J HOWELL
PROJ ENG	.
MFG ENG	–
D	SHEET 2 4

TITLE
TRANSMITTER LAYOUT
ZD20CD SWITCHLESS COMBINER
(3 PHASE) TYPICAL

DWG NO. 843 5467 315. REV A



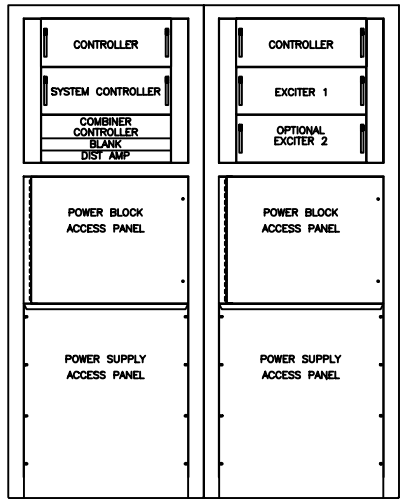
PLAN VIEW



LEFT SIDE VIEW

FRONT VIEW

RIGHT SIDE VIEW



TRANSMITTER A TRANSMITTER B

ENLARGED FRONT VIEW
(NOT TO SCALE)

NOTES

REVISION	LTR	ZONE	DATE	DFTM	ENG	ECO NBR
	A	.	.	.	.	NEW DWG
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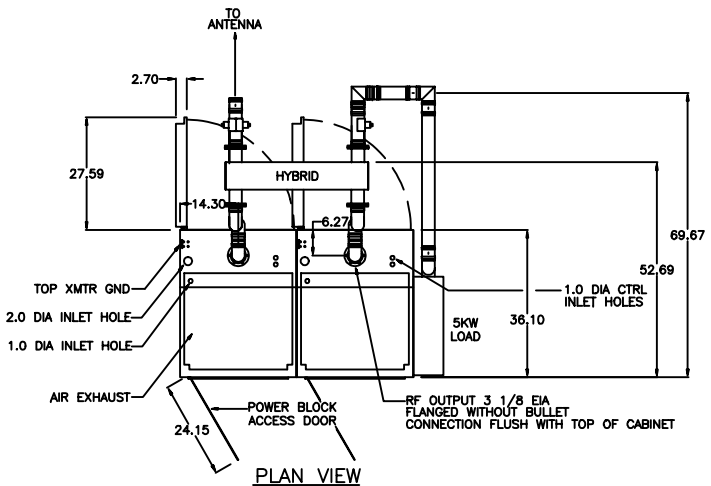
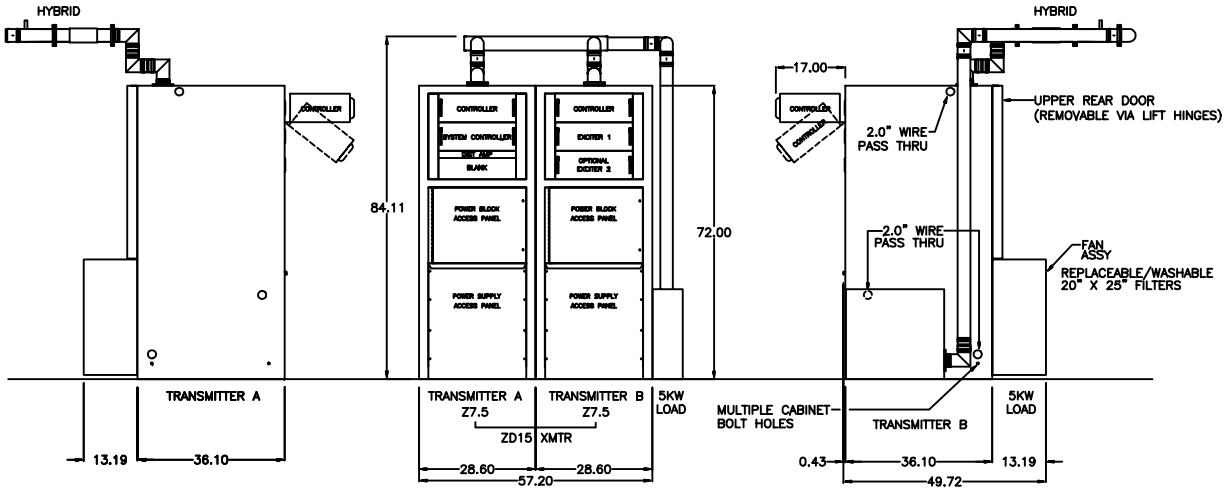
DRAWN BY	K GLASCOCK
DATE	1/3/01
ENG CHK	J HOWELL
PROJ ENG	.
MFG ENG	–
D	SHEET 1 4

TITLE
TRANSMITTER LAYOUT
ZD15CD SWITCHLESS COMBINER
(3 PHASE) TYPICAL

DWG NO. 843 5467 315. REV A



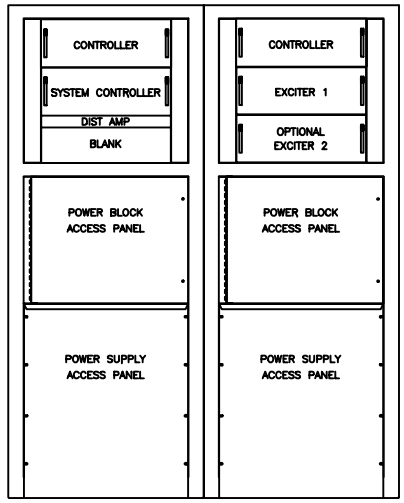
PLAN VIEW



LEFT SIDE VIEW

FRONT VIEW

RIGHT SIDE VIEW



TRANSMITTER A TRANSMITTER B

ENLARGED FRONT VIEW
(NOT TO SCALE)

NOTES

REVISION	LTR	ZONE	DATE	DFTM	ENG	ECO NBR
	A	.	.	.	.	NEW DWG
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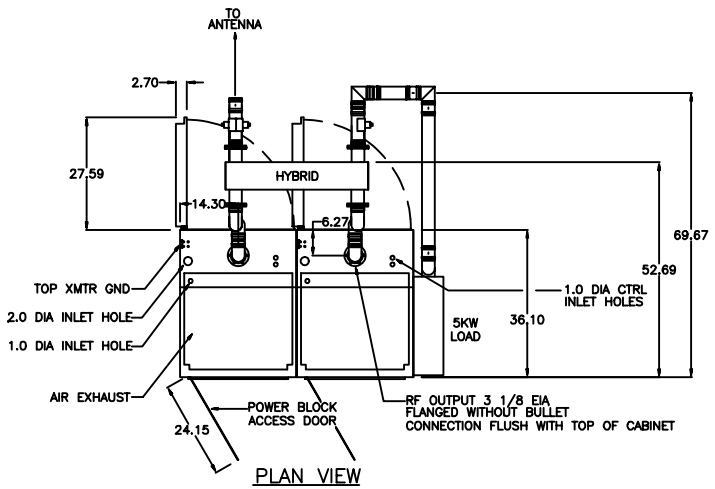
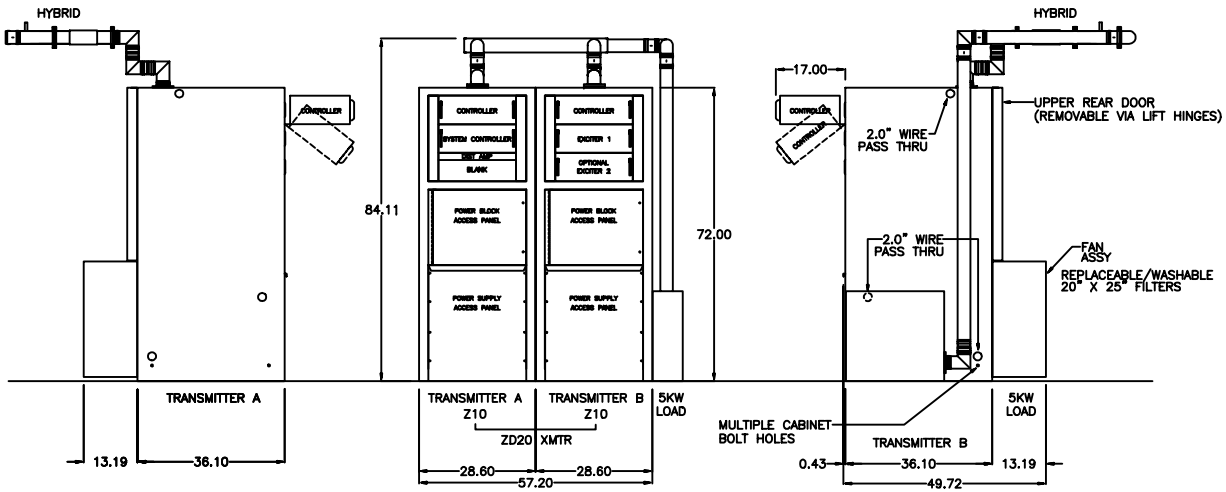
DRAWN BY	K GLASCOCK
DATE	1/3/01
ENG CHK	J HOWELL
PROJ ENG	.
MFG ENG	–
D	SHEET 3 4

TITLE
TRANSMITTER LAYOUT
ZD15CD HYBRID (3 PHASE)
TYPICAL

DWG NO. 843 5467 315. REV A



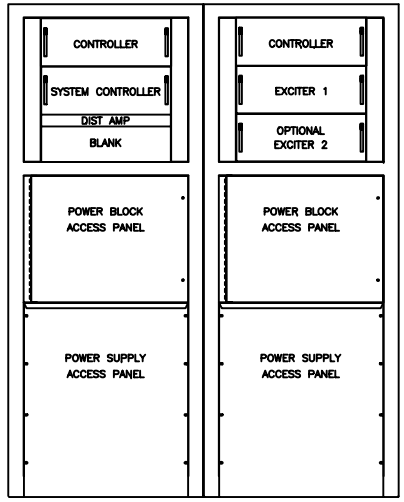
PLAN VIEW



LEFT SIDE VIEW

FRONT VIEW

RIGHT SIDE VIEW



ENLARGED FRONT VIEW
(NOT TO SCALE)

NOTES

REVISION	LTR	ZONE	DATE	DFTM	ENG	ECO NBR
	A	.	.	.	.	NEW DWG
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DRAWN BY	K GLASCOCK
DATE	1/3/01
ENG CHK	J HOWELLL
PROJ ENG	.
MFG ENG	—
D	SHEET 4 4

TITLE
TRANSMITTER LAYOUT
ZD20CD HYBRID (3 PHASE)
TYPICAL

DWG NO. 843 5467 315. REV A

HARRIS

ELECTRICAL / COOLING / MECHANICAL DATA
HARRIS Z2CD 2kW FM TRANSMITTER

All table values referenced to 2kW output power. Values are typical.

PARAMETER NAME	VALUE								
ELECTRICAL									
Nominal Output Power	2kW								
FCC Type-notified Output Power Range	0.4kW - 2.2kW								
Power Consumption	4.0kW								
AC Power Factor	3-phase: 0.95; 1-phase: 0.8.								
Overall Efficiency, AC Input to RF Output	50%								
AC Mains Configuration (one configuration, as ordered)	3-phase, 3-wire closed delta or WYE plus safety ground			3-phase, 4-wire WYE			1-phase, 2-wire plus safety ground		
AC Input Voltage	208	220	240	360	380	415	208	220	240
AC Fuse Size (Notes 1,2)	20	20	20	20	20	20	40	40	40
Possible AC Conductor Size, #THHW wire (Note 3)	12	12	12	12	12	12	8	8	8
Line Amps at Nominal Output	11.7	11.1	10.1	6.8	6.4	5.9	24	22.7	20.8
AC Entrances	Through top or bottom surface of cabinet.								
Grounding/earthing	2” minimum width copper strap between the transmitter cabinet and station RF earth ground. All connections to be bolted together and then soldered or brazed for low resistance connections and long-term reliability. The AC mains earth connection should be connected to the same earth ground.								
COOLING									
	60Hz Mains			50Hz Mains					
	Normal Speed		Maximum	Normal Speed		Maximum			
Cooling Air Volume, ft^3/min	300		550	270		495			
Air Outlet Size	Approx. 23.6” x 3.6” near left and right sidewalls on cabinet top, two total per cabinet.								
Heat Dissipation	2.0kW (6,830 BTU/h)								
Air Conditioning Load	0.56 tons								
MECHANICAL (Note 4)									
Cabinet Size with fan and air filter assembly attached	28.6” (72.6cm) W x 49.72” (126.3cm) D x 72” (183cm) H.								
Weight	3-phase: 1,130 lbs (514kg); 1-phase: 1,225 lbs. (557kg).								
Harmonic Filter	Internal.								
RF Output Connector	1-5/8” EIA flange, female.								
Remote Control Connections	Barrier strip inside upper left sidewall (facing rear of transmitter).								

NOTES:
1. At full output power. Fuse/breaker size should be reduced for significantly lower operating powers, maintaining about a 2X factor above the normal operating current. Contact Harris salesman or factory for the expected value.
2. Wall-mounted fused disconnect or breaker is customer-supplied item. An RK5 class fuse such as the Bussman FRN-R(250V), FRS-R(600V) or LittleFuse FLNR(250V), FLSR(600V) is recommended. If a circuit breaker is used it should have a trip curve similar to that of the RK5 fuse trip curve.
3. All transmitter wiring should be done in conformance with local electrical codes.
4. See Harris drawing 852-9199-015 for complete dimensional information.

DWA 12/99

HARRIS

ELECTRICAL / COOLING / MECHANICAL DATA
HARRIS Z3.5CD 3.5kW FM TRANSMITTER

All table values referenced to 3.5kW output power. Values are typical.

PARAMETER NAME	VALUE								
ELECTRICAL									
Nominal Output Power	3.5kW								
FCC Type-notified Output Power Range	0.875kW - 4.125kW								
Power Consumption	5.8kW								
AC Power Factor	3-phase: 0.95; 1-phase: 0.8.								
Overall Efficiency, AC Input to RF Output	60%								
AC Mains Configuration (one configuration, as ordered)	3-phase, 3-wire closed delta or WYE plus safety ground			3-phase, 4-wire WYE			1-phase, 2-wire plus safety ground		
AC Input Voltage	208	220	240	360	380	415	208	220	240
AC Fuse Size (Notes 1,2)	40	40	40	20	20	20	70	70	70
Possible AC Conductor Size, #THHW wire (Note 3)	8	8	8	10	10	10	6	6	6
Line Amps at Nominal Output	17	16	15	10	9	8	35	33	30
AC Entrances	Through top or bottom surface of cabinet.								
Grounding/earthing	2” minimum width copper strap between the transmitter cabinet and station RF earth ground. All connections to be bolted together and then soldered or brazed for low resistance connections and long-term reliability. The AC mains earth connection should be connected to the same earth ground.								
COOLING									
	60Hz Mains			50Hz Mains					
	Normal Speed		Maximum	Normal Speed			Maximum		
Cooling Air Volume, ft^3/min	300		550	270			495		
RF Cabinet Air Outlet Size	Approx. 23.6” x 3.6” near left and right sidewalls on cabinet top, two total.								
Heat Dissipation	2.3kW (7,850 BTU/h)								
Air Conditioning Load	0.65 tons								
MECHANICAL (Note 4)									
RF Cabinet Size with fan and air filter assembly attached	28.6” (72.6cm) W x 49.72” (126.3cm) D x 72” (183cm) H								
Weight	3-phase: 1,280 lbs (581kg); 1-phase: 1,375 lbs. (624kg).								
Harmonic Filter	Internal.								
RF Output Connector	1-5/8” EIA flange (female).								
Remote Control Connections	Barrier strip inside upper left sidewall (facing rear of transmitter).								

NOTES:

1. At full output power. Fuse/breaker size should be reduced for significantly lower operating powers, maintaining about a 2X factor above the normal operating current. Contact Harris salesman or factory for the expected value.
2. Wall-mounted fused disconnect or breaker is customer-supplied item. An RK5 class fuse such as the Bussman FRN-R(250V), FRS-R(600V) or LittleFuse FLNR(250V), FLSR(600V) is recommended. If a circuit breaker is used it should have a trip curve similar to that of the RK5 fuse trip curve.
3. All transmitter wiring should be done in conformance with local electrical codes.
4. See Harris drawing 852-9199-023 for complete dimensional information.

DWA 12/99

HARRIS

ELECTRICAL / COOLING / MECHANICAL DATA
HARRIS Z5CD 5kW FM TRANSMITTER

All table values referenced to 5kW output power. Values are typical.

PARAMETER NAME	VALUE								
ELECTRICAL									
Nominal Output Power	5kW								
FCC Type-notified Output Power Range	1kW - 5.5kW								
Power Consumption	8.1kW								
AC Power Factor	3-phase: 0.95; 1-phase: 0.8.								
Overall Efficiency, AC Input to RF Output	62%								
AC Mains Configuration (one configuration, as ordered)	3-phase, 3-wire closed delta or WYE plus safety ground			3-phase, 4-wire WYE			1-phase, 2-wire plus safety ground		
AC Input Voltage	208	220	240	360	380	415	208	220	240
AC Fuse Size (Notes 1,2)	40	40	40	20	20	20	70	70	70
Possible AC Conductor Size, #THHW wire (Note 3)	8	8	8	10	10	10	6	6	6
Line Amps at Nominal Output	24	23	21	14	13	12	47	45	41
AC Entrances	Through top or bottom surface of cabinet.								
Grounding/earthing	2” minimum width copper strap between the transmitter cabinet and station RF earth ground. All connections to be bolted together and then soldered or brazed for low resistance connections and long-term reliability. The AC mains earth connection should be connected to the same earth ground.								
COOLING									
	60Hz Mains			50Hz Mains					
	Normal Speed	Maximum		Normal Speed	Maximum				
Cooling Air Volume, ft^3/min	300	550		270	495				
RF Cabinet Air Outlet Size	Approx. 23.6” x 3.6” near left and right sidewalls on cabinet top, two total.								
Heat Dissipation	3.1kW (10,590 BTU/h)								
Air Conditioning Load	0.88 tons								
MECHANICAL (Note 4)									
RF Cabinet Size with fan and air filter assembly attached	28.6” (72.6cm) W x 49.72” (126.3cm) D x 72” (183cm) H								
Weight	3-phase: 1,300 lbs (590kg); 1-phase: 1,395 lbs. (633kg).								
Harmonic Filter	Internal.								
RF Output Connector	1-5/8” EIA flange (female).								
Remote Control Connections	Barrier strip inside upper left sidewall (facing rear of transmitter).								

NOTES:

1. At full output power. Fuse/breaker size should be reduced for significantly lower operating powers, maintaining about a 2X factor above the normal operating current. Contact Harris salesman or factory for the expected value.
2. Wall-mounted fused disconnect or breaker is customer-supplied item. An RK5 class fuse such as the Bussman FRN-R(250V), FRS-R(600V) or LittleFuse FLNR(250V), FLSR(600V) is recommended. If a circuit breaker is used it should have a trip curve similar to that of the RK5 fuse trip curve.
3. All transmitter wiring should be done in conformance with local electrical codes.
4. See Harris drawing 852-9199-003 for complete dimensional information.

DWA 12/99

HARRIS

ELECTRICAL / COOLING / MECHANICAL DATA
HARRIS Z7.5CD 7.5kW FM TRANSMITTER

All table values referenced to 7.5kW output power. Values are typical.

PARAMETER NAME	VALUE								
ELECTRICAL									
Nominal Output Power	7.5kW								
FCC Type-notified Output Power Range	1.88kW - 8.25kW								
Power Consumption	11.7kW								
AC Power Factor	3-phase: 0.95; 1-phase: 0.8.								
Overall Efficiency, AC Input to RF Output	64%								
AC Mains Configuration (one configuration, as ordered)	3-phase, 3-wire closed delta or WYE plus safety ground			3-phase, 4-wire WYE			1-phase, 2-wire plus safety ground		
AC Input Voltage	208	220	240	360	380	415	208	220	240
AC Fuse Size (Notes 1,2,4)	80	80	80	45	45	45	75	75	75
Possible AC Conductor Size, #THHW wire (Notes 3,4)	4	4	4	8	8	8	6	6	6
Total Line Amps at Nominal Output (Note 4)	34	32	30	20	19	17	70	67	61
AC Entrances	Through top or bottom surface of cabinet(s).								
Grounding/earthing	2” minimum width copper strap between the transmitter cabinet(s) and station RF earth ground. All connections to be bolted together and then soldered or brazed for low resistance connections and long-term reliability. The AC mains earth connection should be connected to the same earth ground.								
COOLING									
	60Hz Mains			50Hz Mains					
	Normal Speed		Maximum	Normal Speed			Maximum		
Cooling Air Volume, ft^3/min	600		1110	540			1000		
Air Outlet Size	Approx. 23.6” x 3.6” near left and right sidewalls on cabinet top, two total per cabinet.								
Heat Dissipation	4.2kW (14,330 BTU/hr)								
Air Conditioning Load	1.2 tons								
MECHANICAL (Note 5)									
Number of Cabinets	3-phase: 1; 1-phase: 2.								
Cabinet Size with fan and air filter assembly attached	1- and 3-phase units: RF Cabinet: 28.6” (72.6cm) W x 49.72” (126.3cm) D x 72” (183cm) H. 1-phase units: additional cabinet of height and width equal to the RF cabinet, depth = 38” (96.5cm), with 38” (22 R.U.) of 19” EIA panel mounting space available for customer-supplied components.								
Weight	3-phase: 1,710 lbs (776kg); 1-phase: 2,260 lbs. (1,026kg).								
Harmonic Filter	Internal.								
RF Output Connector	1-5/8” EIA flange, female.								
Remote Control Connections	Barrier strip inside upper left sidewall of main cabinet (facing rear of transmitter).								

NOTES:

1. At full output power. Fuse/breaker size should be reduced for significantly lower operating powers, maintaining about a 2X factor above the normal operating current. Contact Harris salesman or factory for the expected value.
2. Wall-mounted fused disconnect(s) or breaker(s) are customer-supplied item(s). An RK5 class fuse such as the Bussman FRN-R(250V), FRS-R(600V) or LittleFuse FLNR(250V), FLSR(600V) is recommended. If a circuit breaker is used it should have a trip curve similar to that of the RK5 fuse trip curve.
3. All transmitter wiring should be done in conformance with local electrical codes.
4. For 1-phase units, breakers and wire sizes are given *per feed* to each cabinet (two cabinets, total).

HARRIS

ELECTRICAL / COOLING / MECHANICAL DATA
HARRIS Z10CD 10kW FM TRANSMITTER

All table values referenced to 10kW output power. Values are typical.

PARAMETER NAME	VALUE								
ELECTRICAL									
Nominal Output Power	10kW								
FCC Type-notified Output Power Range	2kW - 11kW								
Power Consumption	16.1kW								
AC Power Factor	3-phase: 0.95; 1-phase: 0.8.								
Overall Efficiency, AC Input to RF Output	62%								
AC Mains Configuration (one configuration, as ordered)	3-phase, 3-wire closed delta or WYE plus safety ground			3-phase, 4-wire WYE			1-phase, 2-wire plus safety ground		
AC Input Voltage	208	220	240	360	380	415	208	220	240
AC Fuse Size (Notes 1,2,4)	80	80	80	45	45	45	75	75	75
Possible AC Conductor Size, #THHW wire (Notes 3,4)	4	4	4	8	8	8	6	6	6
Total Line Amps at Nominal Output (Note 4)	48	46	42	28	26	24	93	88	81
AC Entrances	Through top or bottom surface of cabinet(s).								
Grounding/earthing	2” minimum width copper strap between the transmitter cabinet(s) and station RF earth ground. All connections to be bolted together and then soldered or brazed for low resistance connections and long-term reliability. The AC mains earth connection should be connected to the same earth ground.								
COOLING									
	60Hz Mains			50Hz Mains					
	Normal Speed		Maximum	Normal Speed		Maximum			
Cooling Air Volume, ft^3/min	600		1110	540		1000			
Air Outlet Size	Approx. 23.6” x 3.6” near left and right sidewalls on cabinet top, two total per cabinet.								
Heat Dissipation	6.1kW (20,813 BTU/hr)								
Air Conditioning Load	1.75 tons								
MECHANICAL (Note 5)									
Number of Cabinets	3-phase: 1; 1-phase: 2.								
Cabinet Size with fan and air filter assembly attached	1- and 3-phase units: RF Cabinet: 28.6” (72.6cm) W x 49.72” (126.3cm) D x 72” (183cm) H. 1-phase units: additional cabinet of height and width equal to the RF cabinet, depth = 38” (96.5cm), with 38” (22 R.U.) of 19” EIA panel mounting space available for customer-supplied components.								
Weight	3-phase: 1,750 lbs (795kg); 1-phase: 2,300 lbs. (1,045kg).								
Harmonic Filter	Internal.								
RF Output Connector	3-1/8” EIA flange, female.								
Remote Control Connections	Barrier strip inside upper left sidewall of main cabinet (facing rear of transmitter).								

NOTES:

1. At full output power. Fuse/breaker size should be reduced for significantly lower operating powers, maintaining about a 2X factor above the normal operating current. Contact Harris salesman or factory for the expected value.
2. Wall-mounted fused disconnect(s) or breaker(s) are customer-supplied item(s). An RK5 class fuse such as the Bussman FRN-R(250V), FRS-R(600V) or LittleFuse FLNR(250V), FLSR(600V) is recommended. If a circuit breaker is used it should have a trip curve similar to that of the RK5 fuse trip curve.
3. All transmitter wiring should be done in conformance with local electrical codes.
4. For 1-phase units, breakers and wire sizes are given *per feed* to each cabinet (two cabinets, total).
5. See Harris drawing 852-9199-011 for complete dimensional information.

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HARRIS

ELECTRICAL / COOLING / MECHANICAL DATA
HARRIS ZD15CD 15kW FM TRANSMITTER

All table values referenced to 15kW output power. Values are typical.

PARAMETER NAME	VALUE								
ELECTRICAL									
Nominal Output Power	15kW								
FCC Type-notified Output Power Range	3.76kW - 16.5kW								
Power Consumption	23.4kW								
AC Power Factor	3-phase: 0.95; 1-phase: 0.8.								
Overall Efficiency, AC Input to RF Output	64%								
AC Mains Configuration (one configuration, as ordered)	3-phase, 3-wire closed delta or WYE plus safety ground			3-phase, 4-wire WYE			1-phase, 2-wire plus safety ground		
AC Input Voltage	208	220	240	360	380	415	208	220	240
AC Fuse Size (Notes 1,2,4)	80	80	80	45	45	45	75	75	75
Possible AC Conductor Size, #THHW wire (Notes 3,4)	4	4	4	8	8	8	6	6	6
Total Line Amps at Nominal Output	68	64	60	40	38	34	140	134	122
AC Entrances	Through top or bottom surface of cabinets.								
Grounding/earthing	2” minimum width copper strap between the transmitter cabinet(s) and station RF earth ground. All connections to be bolted together and then soldered or brazed for low resistance connections and long-term reliability. The AC mains earth connection should be connected to the same earth ground.								
COOLING									
	60Hz Mains			50Hz Mains					
	Normal Speed		Maximum	Normal Speed		Maximum			
Cooling Air Volume, ft^3/min	1,200		2,220	1,080		2,000			
Air Outlet Sizes	Approx. 23.6” x 3.6” near left and right sidewalls on cabinet top, two total per cabinet.								
Heat Dissipation	8.4kW (28,660 BTU/hr)								
Air Conditioning Load	2.4 tons								
MECHANICAL (Note 5)									
Number of Cabinets	3-phase: two; 1-phase: four.								
Cabinet Size with fan and air filter assembly attached	1- and 3-phase units: RF Cabinets: 28.6” (72.6cm) W x 49.72” (126.3cm) D x 72” (183cm) H. 1-phase units: two additional cabinets of height and width equal to the RF cabinet, depth = 38” (96.5cm), each with 38.5” (22 R.U.) of 19” EIA panel mounting space available for customer-supplied components.								
Weight (less output combiner)	3-phase: 3,420 lbs (1,552kg); 1-phase: 4,520 lbs. (2,052kg).								
Harmonic Filtering	Internal.								
RF Output Connector	3-1/8” EIA flange, female.								
Remote Control Connections	Barrier strip inside upper left sidewall of RF cabinets (facing rear of transmitter).								

NOTES:

1. At full output power. Breaker/fuse size should be reduced for significantly lower operating powers, maintaining about a 2X factor above the normal operating current. Contact Harris salesman or factory for the expected value.
2. Wall-mounted fused disconnect(s) or breaker(s) are customer-supplied item(s). An RK5 class fuse such as the Bussman FRN-R(250V), FRS-R(600V) or LittleFuse FLNR(250V), FLSR(600V) is recommended. If a circuit breaker is used it should have a trip curve similar to that of the RK5 fuse trip curve.
3. All transmitter wiring should be done in conformance with local electrical codes.
4. Breakers and wire sizes are given *per feed* to each cabinet.

HARRIS

ELECTRICAL / COOLING / MECHANICAL DATA
HARRIS ZD20CD 20kW FM TRANSMITTER

All table values referenced to 20kW output power. Values are typical.

PARAMETER NAME	VALUE								
ELECTRICAL									
Nominal Output Power	20kW								
FCC Type-notified Output Power Range	5kW - 22kW								
Power Consumption	32.2kW								
AC Power Factor	3-phase: 0.95; 1-phase: 0.8.								
Overall Efficiency, AC Input to RF Output	62%								
AC Mains Configuration (one configuration, as ordered)	3-phase, 3-wire closed delta or WYE plus safety ground			3-phase, 4-wire WYE			1-phase, 2-wire plus safety ground		
AC Input Voltage	208	220	240	360	380	415	208	220	240
AC Fuse Size (Notes 1,2,4)	80	80	80	45	45	45	75	75	75
Possible AC Conductor Size, #THHW wire (Notes 3,4)	4	4	4	8	8	8	6	6	6
Total Line Amps at Nominal Output	96	92	84	56	52	48	186	176	162
AC Entrances	Through top or bottom surface of cabinets.								
Grounding/earthing	2” minimum width copper strap between the transmitter cabinet(s) and station RF earth ground. All connections to be bolted together and then soldered or brazed for low resistance connections and long-term reliability. The AC mains earth connection should be connected to the same earth ground.								
COOLING									
	60Hz Mains			50Hz Mains					
	Normal Speed		Maximum	Normal Speed		Maximum			
Cooling Air Volume, ft^3/min	1,200		2,220	1,080		2,000			
Air Outlet Sizes	Approx. 23.6” x 3.6” near left and right sidewalls on cabinet top, two total per cabinet.								
Heat Dissipation	12.2kW (41,625 BTU/hr)								
Air Conditioning Load	3.5 tons								
MECHANICAL (Note 5)									
Number of Cabinets	3-phase: two; 1-phase: four.								
Cabinet Size with fan and air filter assembly attached	1- and 3-phase units: RF Cabinets: 28.6” (72.6cm) W x 49.72” (126.3cm) D x 72” (183cm) H. 1-phase units: two additional cabinets of height and width equal to the RF cabinet, depth = 38” (96.5cm), each with 38.5” (22 R.U.) of 19” EIA panel mounting space available for customer-supplied components.								
Weight (less output combiner)	3-phase: 3,500 lbs (1,590kg); 1-phase: 4,600 lbs. (2,090kg).								
Harmonic Filtering	Internal.								
RF Output Connector	3-1/8” EIA flange, female.								
Remote Control Connections	Barrier strip inside upper left sidewall of RF cabinets (facing rear of transmitter).								

NOTES:

1. At full output power. Breaker/fuse size should be reduced for significantly lower operating powers, maintaining about a 2X factor above the normal operating current. Contact Harris salesman or factory for the expected value.
2. Wall-mounted fused disconnect(s) or breaker(s) are customer-supplied item(s). An RK5 class fuse such as the Bussman FRN-R(250V), FRS-R(600V) or LittleFuse FLNR(250V), FLSR(600V) is recommended. If a circuit breaker is used it should have a trip curve similar to that of the RK5 fuse trip curve.
3. All transmitter wiring should be done in conformance with local electrical codes.
4. Breakers and wire sizes are given *per feed* to each cabinet.